The adaptive capability of the operational team to respond to challenges in the Emergency Centre. A SenseMaker® study in Emergency Centres within Cape Town.

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Declaration

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Abstract

Background

Emergency centres (ECs) serve as a main entry point for patients into hospitals, and patients that present here are undifferentiated with varying levels of acuity. Uncertainty, interruptions, multiple – often conflicting – priorities, and gaps in information flow are inherent to EC work practices, making it a high-risk environment for operational failure. The EC team, the core of which is formed by doctors and nurses, needs the ability to collaboratively and reliably sense and respond to the constant change and flux of information. This depends on the interactions and sense-making of the EC team.

Objectives

People give meaning to situations through the process of sense-making; they then subjectively construct their reality and share it via plausible stories regarding their situation and environment. The main objective of this study was to explore the collective team-based sense-making of the operational challenges and decisions within the EC. This interprofessional study focused on the dynamics and negotiations within the EC as a complex adaptive system.

Methods

This exploratory study used narrative-based inquiry with abductive reasoning to meet the objectives. It was divided into two sections. The first was a thick description of the EC context, daily operations and processes. Then, using the SenseMaker® tool, we captured stories about a situation that stood out to participants, and thus mattered to them. Using this novel method, once they told their story, the storytellers self-analysed their stories within a specially designed framework. The results were then explored to find patterns based on the perspectives of sense-making.

Results

There is no proof of interprofessional sense-making in the EC, and if it occurs it is due to the informal networks between doctors and nurses, and despite formal structure. There is an operational disconnect between doctors, nurses and management, which is caused by information asymmetry, poor feedback loops and disparate communication channels. Because there is no collective sense-making, the EC team is vulnerable to operational failure and crises. Currently, they respond to operational challenges via quick fixes that result in

constant firefighting, the impact of which could be seen by the extensive use of war-related metaphors in their stories.

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List of key terms used

Adaptive capability	A dynamic systems property that allows the organisation to respond to environmental cues, ambiguity and change. Adaptive capability is concerned with real-time change, cross-functional relationships and communication patterns. It is embedded in the organisational structure, systems, management style and daily routines.
Agency	It refers to human action. In this study, it refers to the capacity to act, with an emphasis on 'power' to act. Through their actions, agents produce structures (1).
Anthro-complexity	A term used by Prof. D. Snowden to describe an approach that combines applied complexity with narrative and language, and thus mental frameworks. Human complex systems differ from other complex systems, e.g. beehives, due to narrative abilities. Also referred to as cognitive complexity (2).
Boarders	A practice of keeping patients that should be admitted into the hospital in the EC for hours or days until hospital beds are available.
Bureaucracy	A type of organisational structure that divides people and jobs into areas of specialisation. It also divides thought processes into narrow areas of expertise. Bureaucracies dictate that information sharing and communication pathways move vertically in functional silos, integrating knowledge at the top of a hierarchy where the decision-making power lies. There is limited opportunity for horizontal integration of knowledge, information and understanding.
Complex adaptive system	In these systems, the connections, cohesion and interactions between parts are more important than the behaviour of individual parts and structures. All actions are interconnected, and behaviour cannot be predicted. A complex system is adaptive because of the ability to respond by self-organising to change within the system. (Also see anthro-complexity).
Constraint	A trait that influences the connections within a (complex) system, giving the system certain characteristics that may inhibit or enable processes and functioning, e.g. ideology and social mechanisms in the EC.

Capacity	The ability of the combined resources in an organisation to deliver an output, while limited by the resource that is in the shortest supply, e.g. physical design, human resources or budget. In the EC, measures of capacity could include surge volume, patient arrival and journey.
Crisis	A low probability/high consequence situation that threatens the continuous activity of an organisation. Crisis is characterised by volatility, uncertainty regarding cause and the next steps or crisis resolution (3, 4).
Culture	The pattern of shared assumptions in an organisation or within a subgroup, e.g. doctors or nurses, that informs sense-making, problem solving and understanding. It is the product of social indoctrination (5).
Cynefin framework	Cynefin is a Welsh word with no direct translation in English. It refers to 'habitat' or 'place' or a sense of familiarity (6). The Cynefin framework is a conceptual sense-making framework, especially useful in complex situations. It describes 5 domains: obvious, complicated, chaotic, complex and disorder.
Dyads	In SenseMaker® surveys, a dyad has a slider positioned between two extreme polarities on a linear scale, where both extremes are considered undesirable. This may appear similar to other commonly used linear scales, the difference being that the preferred state is somewhere in between the two extremes.
Emergence	A defining property of complex systems, referring to new patterns that are still in the process of becoming visible. It is the result of the unpredictable interaction between connections within the system.
Emergency centre	The Emergency centre (EC) is the dedicated area in a hospital that provides care 24 hours a day, seven days a week, 365 days a year to patients who self-present or arrive via ambulance, without prior appointment. The care rendered in the EC includes the initial treatment, diagnosis and stabilisation of patients. The patients present with any complaint, are of any age and have varying acuities that require considerably different levels of care.

Heuristics	Cognitive shortcuts that ignore part of the information presented in order to speed up sense-making or decision-making.
High-reliability organisations	Organisations that are able to avoid crisis and catastrophe despite a high level of risk and complexity where minor errors could have large consequence. They are able to avert this because of collective mindfulness. There are 5 principles: preoccupation with failure and minor error; reluctance to simplify processes by accepting complexity; sensitivity to operations by seeking input from front-line staff; commitment to resilience due to a state of preparedness and anticipation of flux; deference to expertise by acknowledging front-line knowledge (7).
Ideology	Mental frame justifying certain social identities to hold more power than others. Refers to the interplay between space, environment power e.g. positional power in the chain of command (8).
Inattentional blindness	People only notice what they have been primed to scan for, and they can become blinded to other signals – even if they are obvious or life-threatening. Selectively ignoring cues that project 'danger' is referred to as inattentional blindness. This is more likely to occur in environments with information overload and fragmented social cohesion (9).
Mental frame	Conceptual structures in the mind that organises prior knowledge and exposures, and informs behaviour and attitude (10, 11). Also called cognitive or mind frame.
Metaphors	A way in which people express their conceptual structures (mental frames) with language and expressions. The expression is not literally true.
Naturalistic decision-making	An empirical knowledge-based approach that builds on cognitive psychology. It studies sense and decision-making and the use of cognitively complex functions (macrocognition) in dynamic actual situations (11).
Non-hypothesis study	In these studies, typically used in exploratory research, no hypothesis is formulated. It contains a broad exploratory question and remains flexible for novel insights. The term is often used in

	conjunction with grounded theory and/or abductive research methods.
Operations/ Operational	The meaning of the term may differ according to the discipline (12). In this study it refers to the role of doctors and nurses employed in the EC of the hospital. They are actively involved in the ECs daily activities and are responsible for delivering services in ways that are productive, cost-effective, meet key performance indicators, and other efficiencies.
Patterns	In SenseMaker®, patterns refer to repeating appearances of the visualised data demonstrating the self-interpreted data, e.g. clusters, outliers or evenly dispersed data.
Plausible stories	Collective stories that are assumed to be true, and therefor act as constraints that reinforce certain actions and beliefs within a group.
Psychological safety	Described as the perception of the consequence of taking interpersonal risks, e.g. sharing information, knowledge or collaborating. It is used here in the context of the workplace, i.e. the EC (13).
Relational bureaucracy	A type of organisational structure that blends the strengths of relational and bureaucratical structures. The relational organisational structure is also referred to as a clan-based network of organic organisational structures (14).
Resilience	The intrinsic organisational capability to function reliably during times of flux, volatility and change. Resilience is enabled by social cohesion and collaboration (15, 16).
SenseMaker®	A suite of software tools developed by Cognitive Edge. It is commonly used to analyse process conditions in complex human systems. It does this by employing a novel narrative method that extensively uses visualisation to identify patterns.
Sense-making	In this study, sense-making is defined as the interprofessional, collective process of people selecting and acting on sensory cues in the EC environment. Sense-making is achieved through sharing information and knowledge in networks and is mostly done via narrative.

Silo	In organisational terms, a silo is an overly isolated organisational identity (17).
Stones	In SenseMaker® surveys, stones are big dots that mark a place on a rectangular canvas. The axes along the sides of the rectangle describe ranges of two aspects of the story.
Stories	A fundamental way of human communication that in an organisation shares the values, norms, expected behaviours and other wisdom. It includes metaphors, informal stories, gossip, grapevine and anecdotes describing situations that may be real or imaginary, yet the outcomes or 'lessons learnt' are generally accepted and shared.
Stereotypes	A type of mental framework where certain theories or expectations are held about another group (e.g. beliefs about opposite genders, races or cultures). Broadly speaking, doctors and nurses have stereotypical beliefs about their role and the roles of others.
Structure	Generally refers to rules and resources that allow binding in time and space (1).
Systemic issues	A problem due to issues that are built into the overall system and structure.
Tacit knowledge	Tacit knowledge is knowledge gained by experience and exposure. It is difficult to transfer, as the person might not be aware of their own knowledge. Tacit knowledge is the opposite of codified or formal knowledge (18).
Temporality	Temporality is a subjective construction or perception of time and situation (space). People attach symbolic value to their/the organisation's time orientation, e.g. past, present or future focus. This includes their attitude to time, views on the use of time, pace and other perceptions of time.
Thick description	A thick description paints a clear and detailed picture presenting context, culture and dimensions of social behaviour. It provides a sense of the participant's perceptions and is the interpretation of the description that makes it thick (19).
Triads	In SenseMaker® surveys, triads are triangular grids with labelled variables forming the corners. The interior of a triad represents the

	relative proportions of the three corner variables, while the storyteller is tasked with placing a dot anywhere inside the triangle to show how the variables trade off against each other.
Verbing	Using a word that is not conventionally used as a verb (typically a noun) as verb to give it energy/movement in time-space.

List of key abbreviations used

CAS	Complex Adaptive Systems
CHC	Community Health Centre
COPD	Chronic Obstructive Pulmonary Disease
csv file	Comma separated value file
EC	Emergency Centre
EM	Emergency Medicine
EMDRC	Emergency Medicine Divisional Research Committee
FMCG	Fast-moving consumer goods
HPCSA	Health Professionals Council of South Africa
HREC	Human Research Ethical Committee
HRO	High-Reliability Organisations
LOS	Length of stay
MBA	Master of Business Administration
NDM	Naturalistic decision-making
NHS	National Health Service (United Kingdom)
NRD	National Research Database
PRD model	Prime-recognition-decision-making model
SANC	South African Nursing Council
SATS	South African Triage Scale
TB	Tuberculosis
TTO	To take out medication
WCG	Western Cape Government

Chapter 1: Introduction

The Emergency Centre (EC) provides continuous care to patients that present without prior appointment and with varying acuities that require considerably different levels of care. Clinically the EC staff must be geared to deal with any diagnoses or age patient, whilst operationally they need to be prepared to deal with incredible levels of variability. The EC is, therefore, an environment in constant flux, requiring time-critical decisions and constant monitoring, with no one holding complete knowledge about unfolding situations, flux and information.

So, how do people in the EC figure out what's happening? Who do they speak to about their insights and understandings? And then what do they do once they have those conversations?

These are the types of questions that studies in sense-making set out to answer (20).

The clinical people in the EC mainly consist of doctors and nurses who work closely together, sharing the same space, patients and resources. This raises another set of questions that a study in sense-making could provide insights into:

Do doctors and nurses hold the same views when making sense of situations and dealing with flux? Do they share the same views on how these should be managed? Do they communicate and share emerging insights and knowledge, or do they withhold it and keep it within their silo?

1.1 Statement of the problem

To cope in a dynamic environment like the EC requires that the unit possesses an inherent capacity to sense emergence, deal with gaps in information and adapt to situations as they unfold. Conditions in the EC environment are not static: they are constantly re-created by influx, decisions, reactions and interactions. Everyone in the clinical team holds unique pieces of information and, often, there is insufficient time to search for more information, or information is too rapidly outdated which limits the connection between what next steps to take and their consequences (21).

The people in the EC are interdependent – their actions and behaviours impact on one another. Often in unpredictable and disproportionate ways. Constraints in the environment enable or hinder sense-making and figuring out appropriate next steps. Some constraints are visible e.g. physical layout and visible rules. More nuanced constraints are created by professional identities, informal communication networks, accepted behaviours and beliefs. Overarching these are culture and team dynamics that have intricate constraints, with tangible and intangible aspects.

The issues raised above are some of the characteristics of complex adaptive systems (CAS), more recently referred to as anthro-complexity when studied in relation to the interaction of human systems (2). The distinction is made because humans deal with narrative and language in addition to the other aspects of complex systems, making them unique and different from other CAS (e.g. beehives, flocking birds and rain forests) (22).

To gain insight into whole systems performance, the various aspects and parts of complex systems cannot be studied individually. Yet, the EC and its people are often studied in isolated parts e.g. discipline-specific studies, or patient flow. Focused studies on isolated parts of the EC certainly have merit and are vital to advance discipline and topic-specific knowledge. The shortfall of isolated, narrowly defined or hypothesis-led studies lie in their inability to paint a picture of interactions between study matter and other parts of the system. Taking the anthro-complexity stance, the interplay between system, structure, people and constraints is what allows the EC to operate continuously.

This broad exploratory study considers the intricate interplay of the above aspects throughout the daily functioning of the EC, acknowledging that reliable and efficient operations are possible only through the interdependence and interconnection of the main operators within it – namely the doctors and nurses. Sense-making is the interprofessional, collective process of people sharing information, knowledge and reciprocal networking, mostly done via narrative.

In this study, the doctors and nurses were asked to share a typical story about their daily situation that stands out to them, one that matters to them. They then self-interpreted their story within a specialised framework, the results of which have provided us with interpretive meta-data to explore for patterns of sense-making dynamics (23).

In complex systems like the EC, sustainable new practices can be achieved by challenging the existing paradigms, tweaking predominant narratives and adjusting constraints (21). Step one would be knowing what those are. By combining the narrative method with a contextual description of the EC, novel insights are gained into the plausible accounts of the daily reality of it – as told by those on the frontline. By exposing the plausible stories and taken-for-granted assumptions of how things work in the EC, insight is gained into the existing paradigms, narratives and perceived constraints. These are so deeply ingrained that they are often obscured, even to those within the system. Yet they prevail throughout, determining the EC's reality, interactions and thus efficiencies (5).

1.2 Quest for meaning

There is a continuous inflow of information creating flux. The people working in the EC simply cannot respond to everything happening around them, so they select specific cues or signals to react to (4). What they select depends on what they have been conditioned to see via narrative – including stories told to the self, stories created in dialogue with others, and those endorsed by the organisation in its policies, procedures and organisational structures.

The EC's people share their stories and the most 'plausible stories' of these – which are accepted by most of its people – become institutional truths that influence collective mental frames of reference and result in patterned, consistent behaviours. As a result, people react based on what they believe to be true about each situation in which they find themselves. Every newcomer is socialised into the collective mental frameworks that provide the necessary details e.g. who to speak to, who to trust, who to avoid, how to respond to certain situations and how to deal with management (24).

Social constructionists view knowledge as socially produced. In this framework, people co-construct the stories and truths held in the EC that in turn influence general assumptions, behaviours and relationships. Staff perceptions are influenced by role, identity, culture, values and ideology, which are endorsed – to an extent – by external parties e.g. hospital management and professional bodies.

This study considers the adaptive capability of the EC team. Adaptive capability is a dynamic process that entails continuous learning and adjusting to new knowledge. It is embedded within the ECs formal and informal structures.

Adaptive capability is explored from a sense-making perspective. Sense-making involves figuring out what is happening, selecting signals worthy of a response, sharing insights and creating mental frameworks. Sense-making is a broad concept, spanning numerous domains e.g. cognitive psychology, information, communication, language and knowledge management. Even though it has been studied from various stances, there are four main influencers:

- Dervin, the most philosophical, describes individual sense-making and the Sense-Making Methodology (25);
- Klein focuses on the cognitive processes involved in non-deliberate and deliberate sense-making within complex or dynamic naturalistic settings (11);
- Weick describes organisations as socially constructed realities, in which he views sense-making as a collaborative process of creating shared awareness from multiple perspectives. His work informed the high-reliability organisation theory (26); and

- Snowden's work is embedded in anthro-complexity and pattern-seeking. He developed a style of distributed ethnography to capture narratives and explore the multiple realities that are held within groups, using the SenseMaker® tool (2). This tool is proprietary to Cognitive Edge, an organisation that creates methods and tools to explore CAS and deal with uncertainty and create resilience (27).

A combination of Klein and Weick's work formed the underlying constructs and Snowden's methods and tools were used to conduct the study. The research setting is the ECs in Cape Town's large public hospitals and participants comprise all categories of EC doctors and nurses.

1.3 Research method

In this study, collective sense-making in the EC is probed using narrative inquiry and a social constructionist stance. It starts with a descriptive approach, construing the EC context as it exerts an influence on the plausible stories, sense-making and networks within. This includes considering the accumulative effect of the past e.g. recent recognition of Emergency Medicine as a speciality, physical layout of ECs and historical governing structures (28).

Then the SenseMaker® research tool and method are used to analyse the narrative perspectives of the doctors and nurses. They self-interpret their story by answering a set of predetermined questions, which are based on the underlying theoretical framework of the study. Their self-interpretation is captured into a common database that visually displays data for further analysis (23, 29). The tool and design are described in detail in the methodology section. A secondary purpose of the study covers the usefulness of the SenseMaker® tool in this context.

The combination of the descriptive study, SenseMaker® tool and additional narrative analysis provides a rich description of the context, behaviours and experiences in the EC. It helps to identify critical structures and provide an integrative synthesis that accounts how the EC team responds to challenges.

1.4 Relevance and deficiencies in evidence

There are no existing studies that have been published on the process of sense-making in ECs in South Africa. This creates a void in the existing knowledge on sense-making and complex social dynamics in the EC. Together, the ever-present doctors and nurses form the crux of EC operations, which cannot function without them. Yet, their roles and interventions are

typically studied in isolation – thereby disregarding that it is their very entanglement, interconnectedness and interdependence that enables EC operations.

Another gap in the literature relates to how formal and informal structures enable or hinder the ability of EC staff to collaborate and react in the EC. This extends beyond the EC, too – there is a lack of knowledge, internationally, as to how hospital organisations, structures and processes enable or hinder staff in performing their functions (30). This study will therefore generate original knowledge that may provide some indication of the operational efficiency of current structures. Understanding these could be a first step towards bringing about change, improvement and/or policy-making.

The study uses the converging areas of organisational sense-making, naturalistic decision-making and anthro-complexity to build a comprehensive picture and case. These topics are deemed relevant and useful for the further development of emergency care; Weick's early studies of crisis and catastrophe led to later work on collective sense-making and the characteristics of the high-reliability organisation that is able to adapt to consistent flux whilst seamlessly continuing its day-to-day operations (3, 31). Klein's seminal work considered how fire commanders make decisions, with further decision-making studies being carried out in dynamic situations by studying the cognitive patterns and mental frameworks of nuclear scientists, fighter pilots and neonatal critical nurses (11, 32). He extended this work to consider the collective mental frames of teams and subsequent adaptive capability of teams (33).

Combining these studies into one theory and exploring it via narrative will not only increase the relevance of the organisational knowledge produced, but it will further establish where current breakdowns are occurring and thereby pinpointing where future work is required for ECs to become high-reliability units (34).

It is an opportune time for a study like this: emergency medicine is still a developing medical speciality in South Africa, while emergency nursing is not yet recognised as a nursing speciality. This means that the field of emergency care is established enough to have generated plausible stories, yet still new enough to mould. The patterns the study uncovers could be used to inform the selection of the type of interventions that may increase capacity and improve resilience (35).

1.5 Audience

SenseMaker® studies are intended to be practically applied and the primary audience of this work is doctors and nurses in the EC. The study is designed in such a way that they could immediately address some areas of collective sense-making.

Hospital management and policy makers may find the insights gained useful in determining interprofessional policy and procedure. Due to the nature of an exploratory study, those with a research interest in the EC will find it useful to indicate potential focus areas for future studies.

Educators with an interest in interdisciplinary health education and communication, especially those working in emergency care, could use this study to motivate for interprofessional education. Health facility designers and other organisational design theorists might find the observations, especially those regarding EC layout and flow, useful.

1.6 Approach of the study

This exploratory study uses a narrative-based approach built on the fundamental sense-making principle that people interact using narratives to explain situations to themselves and others. Narratives include self-dialogue, chatting, gossip, rumour, formal communication, rules and policies.

1.7 Aims and objectives

1. Contextually place the EC by doing a thick description of a sample of ECs in Cape Town

2. Explore how the team members make sense of the demands within the EC by using a SenseMaker® study

- Distinguish how different roles and hierarchical positions make sense of the changes and challenges within the facility;
- Determine how role players' situational awareness differ based on role; and
- Describe the interactions between the different team members within the EC.

3. Create a contextualised Cynefin framework of the decisions taken in an EC in a facilitated learning setting

- Explore the findings of the SenseMaker® study in a facilitated learning setting; and
- Identify potential grey areas where neither of the teams deems an operational factor as residing within their scope.

1.8 Reporting structure

Overview of chapters:

Chapter 2

The literature review is structured and organised according to the method, starting with an overview of sense-making. Four sense-making perspectives are fused into one process of sense-making. This process is then examined in the context of organisational structure, anthro-complexity and adaptive teams, to explain how teams collectively make sense in dynamic environments. Sense-making remains the thread throughout the chapter, demonstrating that it is also the thread running through culture, organisation, narrative and decision-making.

Chapter 3

This chapter describes the EC's context and dynamics including EC structure, operational management and design. The impact of the hospital's capacity and occupancy rate on inflow, throughput and outflow of patients are discussed. The EC doctor/nurse team is discussed in terms of reciprocity and collaboration. Then the EC and emergency care in South Africa is situated within the rest of the health system, and the various factors faced by the public health system is mentioned.

Chapter 4

A detailed description of the methodology, research design and procedures are put forward. The design of combining the narrative method with a contextual description of the EC is detailed. It is explained how the thick descriptive study locates the EC, capturing the context, daily operations, formal and informal processes. This is followed by a description of the generic design of SenseMaker® studies and their components as recommended by Cognitive Edge, before detailing the specific design used for this study. The framework for the self-analyses was based on the process of sense-making that is discussed in Chapter 2. Trustworthiness of the research design is examined, and the section ends with an analysis of a reflexive journal that forms the bridge into the findings.

Chapter 5

The findings are divided into three chapters, and chapter 5 deals with the significant findings of the descriptive study. This includes findings by means of observation, description and

semi-structured interviews. It aims to contextually locate the formal and informal procedures and processes of the ECs. The formal structures in each EC, e.g. policies, procedures and process, are compared between doctor and nurses in each EC, as well as with those in the other hospitals. Physical layout, conditions and staffing are described.

Chapter 6

In SenseMaker® studies, participants first tell a descriptive story and then they self-interpret their story. Even though the narrative analysis was done last, the chapters follow the layout of the survey and the findings of the narrative analysis is discussed first. For the narrative analysis, data that the participants provided from the prompting question, the titles and metaphors were used in the SenseMaker® study. The main emerging themes of the stories are identified, grouped together and patterns across these are explored.

Chapter 7

This chapter considers the self-analysis of the stories as explored in various ways e.g. using professional role, tenure, role in the story and emotional tone to search for patterns. The patterns are displayed visually and the toggling between quantitative and qualitative data to further explore/find patterns and stories relating to the visual patterns are tabulated and interpreted. The chapter ends with an evaluation of the usefulness of the self-analyses tool (SenseMaker®) in this context. Theory and praxis are combined by demonstrating how SenseMaker® methods can be used to immediately (and cost-effectively) to apply the results within the ECs.

Chapter 8

This chapter starts by tying together the key findings of chapters 5-7 whilst considering the research objectives. Main discussion points include the ambiguous interprofessional team dynamic, how the terminology and metaphors used influences the reality of the work setting. The current state of the ECs is 'diagnosed' and the potential impact on sense-making and the adaptive capability is discussed. A model for sense-making in the EC is developed.

Chapter 9

The empirical, theoretical and methodological contributions that this study makes are discussed. After which recommendations are made. The recommendations flow from the

significant findings and noted study limitations. Suggestions for future research that can build from this exploratory study are made. This is followed by a few concluding remarks.

Chapter 2: Literature review

2.1 Introduction

The literature review was structured and organised according to the research method. It starts by describing what sense-making is in one example. Four key perspectives on sense-making are then discussed in such a way that it builds up to a cohesive argument of how sense-making forms a thread running through culture, organisation, narrative and decision-making. Sense-making in teams and in complex environments are then discussed.

An extensive literature search was carried out at the beginning of the research (2016) and repeated at regular intervals throughout the intervening period, with search terms including sense-making, interprofessional, emergency department/centre/room, organisation, narrative, culture and emergency care. A combination of electronic databases and search engines – e.g. Google Scholar EBSCOHost and PubMed – were employed. In each database, a search was performed using Boolean operated terms e.g. emergency department OR emergency centre OR emergency room AND interprofessional OR team. Articles were screened and selected according to the presence of information of sense-making, emergency centres or interprofessional collaboration. The bibliographies of retrieved records were further used to find other relevant articles. The last full search was done in March 2019.

Additionally, I collaborated with thought-leaders in anthro-complexity and management consulting; and attended two interactive courses to learn how to practically apply the Cynefin framework and use the SenseMaker® method.

The rationale for the flow of the chapter is that it follows the method - starting with an overview of sense-making, continuing to individual sense-making and then onto collective sense-making. With collective sense-making, the concepts of organisation and culture are discussed. Towards the end of the chapter, CAS is discussed, followed by a section on adaptive teams.

2.2 Sense-making

In this study sense-making is about becoming aware of a situation or potential situation, figuring out whether it requires attention, categorising it (e.g. good or bad), and then taking action (e.g. raising an alarm, consulting others - formally or informally -, reporting the situation, deciding to collaborate, negotiate or follow the rules). In sense-making, non-action (e.g. observation, acceptance, silence or knowingly withholding information) is included as a decision (7, 25).

Sense-making is a cognitive approach that considers the inherent unknowability and incomplete knowledge of any current situation. The reality and knowledge of a situation are socially constructed by sharing narratives surrounding the current situation, past situations and the accepted truths that link these. Generally, sense-making studies explore unfolding situations in dynamic settings, detect problems, explore multiple perceptions, interpretations and beliefs related to what is happening, as well as the mental frameworks attached (9).

Sense-making has been studied in various domains and ways e.g. individual versus collective sense-making, retrospective versus prospective sense-making. This study considered the sense-making perspectives that are relevant to the research question. The next section argues how these perspectives fit with this study.

2.2.1 Rationale for the sense-making theoretical perspectives used

To adequately explore the research objectives an in-depth understanding of sense-making was required.

The factors that played a role in deciding which sense-making perspectives to study includes:

- The need for a sense-making methodology and metatheory;
- A sense-making perspective that considers heterogeneous teams, time-critical pressure and potential catastrophic consequence should the sense-making opportunity be missed;
- A perspective that examines sense-making as it occurs in the natural environment, as opposed to a simulated or controlled perspective;
- ECs exist in an organisational bureaucracy, thus a perspective on organisational sense-making; and
- A sense-making perspective that provides a link or explains the junction between the SenseMaker® tool (method) and sense-making.

Four sense-making perspectives met the above criteria, and the reasoning for using each perspective is briefly provided below.

Dervin's perspective on sense-making: the individual and the Sense-Making Methodology

Situated in the field of communication, Dervin designed a so-called Sense-Making Methodology as an approach to study information needs and information-seeking, i.e. communicative practices (20, 25). A metaphorical framework illustrates how the individual

'bridge cognitive gaps' to make sense in the current moment and continue movement (20, 36, 37). The framework highlights the concept of time-space and illustrates that bridging the gap is firmly tied to the past e.g. what worked last time, as well as demonstrating how when the individual bridges the gap, they are propelled into an unknown next moment. The framework is explained in more detail in Section 2.7.1 (page 27).

The Sense-Making Methodology favours the use of narratives and neutral questioning to study communicative practises, information-seeking behaviour and sense-making (37, 38).

Klein's perspective on team sense-making under time-critical conditions

Klein studied time-critical decision-making in real conditions. He approached sense-making from a decision-making angle and hypothesised the presence of a precursor to decision-making i.e. a person detects a cue that requires attention prior to making a decision. The distinction between problem detection and problem-solving is important in sense-making. Klein's data/frame model is an analytical framework that considers the cognitive structures of sense-making. Even though Dervin and Weick assume the presence of, and mention tapping into, mental or cognitive frames, neither offers further details on how these frames are modified (39). The frameworks are discussed in Section 2.7.2 (page 29).

Weick's perspectives regarding organisational theory and collective sense-making

Whereas Dervin focuses on individual cognitive gaps, Weick is focused on 'team cognition'. To Weick, sense-making is deeply related to the process of socialisation. He connects organisational behaviour and organisational knowledge with sense-making (10).

Traditionally, organisations are described as static entities. Weick moves from the tradition, and describes organisations as dynamic, emerging and embedded in formal and informal communicative networks (40). To demonstrate the organisation as a dynamic entity, he uses the verb 'organizing' rather than the classic term organisation (26). Organisational sense-making is discussed in Section 2.8 (page 32).

Snowden's contribution: a conceptual sense-making framework and tool

Snowden considers sense-making as a knowledge-producing activity, where people construct meaning through their stories (41). He describes a conceptual sense-making framework and developed the SenseMaker® tool to help people make sense of complex situations. The conceptual sense-making framework was developed to help people make sense so that they can act, with different types of actions linked to each domain.

None of the other sense-making perspectives explicitly mentions CAS, for example Klein speaks about dynamic environments and there is an overlap between the characteristics referred to in dynamic environments and those commonly attributed to CAS.

Conclusion of rationale: The sense-making perspectives

There is only one Sense-Making Methodology, so studying Dervin was essential. Klein's work was examined to provide a link between sense- and decision-making in dynamic environments. The data/frame model provides a validated explanation of mental frameworks in sense-making. Weick is described as a leading theorist of sense-making in organisations, and the concepts of Snowden was studied to understand the conceptual sense-making framework and his ideas on knowledge management in organisations. How these perspectives are intertwined is demonstrated in Figure 1.

Figure 1: Own understanding of the four sense-making-perspectives

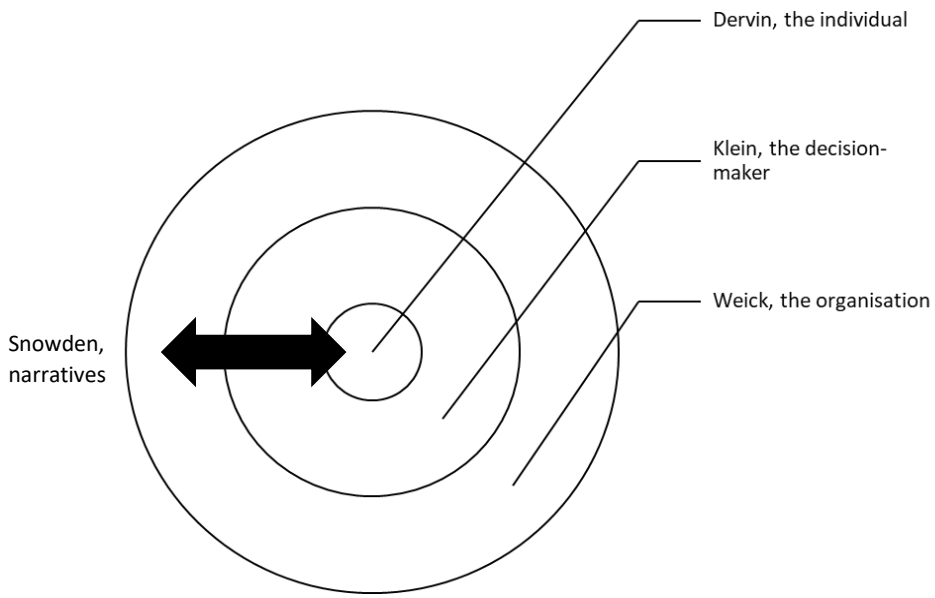


Table 1 contains a summary of the four main perspectives, their predominant field and a brief description of their claims regarding sense-making.

Table 1: A summary of the four sense-making perspectives

	Dervin (20, 37, 42)	**Klein** (11, 32, 43)	**Weick** (26, 40)	**Snowden** (6, 9, 17)
Sense-making is a/an	Individual process in a social world	Active anticipatory process	Social process in an organisation	Pattern-processing method
Predominant field	Communication Information science Education	Cognitive science Human factors Ergonomics	Organisational behaviour High-reliability organisations	Knowledge management Anthro- Complexity
Key terms	Time/space Verbing Gaps	Experience Patterns Data/framework	Collaboration Mindful organising Verbing	Narratives Complexity Shared meaning Patterns
Approach	Post-modern Social constructionist	Naturalist Macrocognition	Post-modern	Action research Grounded theory
Continuity	Infinite	Infinite/ongoing	Ongoing	Finite
We make sense by	Having a dialogue with the self and/or others	Simulation Pattern matching Satisficing	Simulation Pattern matching Socially	Narrative Pattern matching Socially
Ideology	Permeates all reality	No mention	Permeates all reality	Strong influence

2.2.2 The fundamental sense-making properties

There are similarities between the different perspectives and the following sense-making fundamentals highlight that the overall epistemology and ontology of sense-making as concept remain similar, regardless of perspective.

Knowledge and understanding are always emerging

Sense-making is temporary, emerging, partial and subjective. The Sense-Making Methodology's metaphorical framework uses a gap-bridging analogy, describing the world as a 'gappy reality'. Bridging the 'gappy reality' is how sense-making occurs, and the process is ongoing, requiring constant attention and re-sense-making (42, 44).

Sense-making is embedded in previous encounters and a group of individuals facing the same situation will have different perspectives regarding the meaning of the situation, and how to 'bridge' the situation. Knowledge is thus partial, subjective and influenced by history.

The downside of having all these multiple individual perspectives in a team is that it takes time to negotiate the multiple perspectives and to make collective sense. However, Weick,

Klein and Snowden argue that including multiple perspectives are necessary to 'complete' the partial knowledge held by individuals to see a wider or fuller emerging picture, thus improving the ability to adapt during dynamic situations (9, 16, 45). Their views are that the organisation or team needs to develop mechanisms that allow early/continuous scanning, common ground and rapid feedback loops.

Sense-making emphasises the inherent unknowability of current and future realities

Emerging knowledge creates discontinuous perception regarding reality creating new gaps in the current knowledge. This discontinuity is a core premise of sense-making that Colville refers to as continuous, discontinuous change (46). To continue movement in time/space, gaps are filled with assumptions, plausible stories, structures and rules (42, 47). In an organisation and/or team, these assumptions are shared, and the shared stories support the movement. This is why capturing the everyday stories told, i.e. plausible stories, can be used to anticipate organisational responses to certain situations (34).

The assumptions shared in the workplace thus determines the types of actions that people will take. This includes assumptions regarding what would happen when speaking up, disagreeing, or offering insights. The actions may include ignoring the situation, offering an alternative view or reporting a situation. Whatever the course of action, the situation will change and thus the individual or team are co-creators of their reality (42).

Reality is subjective and socially constructed by individuals and groups

Individuals in the same situation will have different truths regarding the situation. In the workplace, the perspectives are influenced by, amongst other factors, professional role. For example, if the waiting room in the EC is full, the doctor, triage nurse and administrative clerk will each hold a different perspective on what they deem the causes, solutions and potential outcomes to be. Their perspectives inform their stressors, feelings and priorities regarding this situation. Other than professional role and identity, the perspectives that people hold are strongly influenced by organisational factors including the rules, resources and the perceived ability to respond to the situation (agency)(15, 48).

There is a recursive relationship between the emotional dynamics experienced in a team and how situations are dealt with. The feelings that team members experience e.g. feeling anxious, will influence the person's ability to express themselves, their willingness to share information and listen to others, as well as the degree of their disclosure. Further, the ability

to pick up on emerging situations are influenced by the emotional status of the person, and experiencing strong emotions may impact on the ability to sense cues and change (4, 44, 49).

Dynamic conditions are demonstrated by the extensive use of verbs

Sense-making is a verbing approach, that considers verbs and processes rather than nouns and objects. Nouns are static and frozen in time and space e.g. rules, whereas the actions taken can be articulated as verbing's e.g. following rules, finding common ground, taking control or making assumptions (15, 50, 51).

In sense-making, concepts such as knowledge, culture and organisation are referred to as verbs and positioning the Sense-Making Methodology as a verbing approach signifies that sense-making is about action and process conditions, and not about theory and static conditions. Essentially, sense-makers gain knowledge by acting themselves into understanding (3, 20, 42).

Reality and understanding are shared via a narrative with self and others

Narratives organise know-how, sequence and consequence. A plausible story keeps things together for long enough to generate momentum and traction; thus, sense-making is deeply related to how and with whom people share their stories, i.e. socialisation (16).

Sense-making sees organisations as narratively constructed with the narratives positioning people and situations in time and space (20). Stated differently, ECs are socially constructed verbal systems with team members circulating stories, metaphors and common language to inform others what to notice and how to behave. Despite each member having voice and agency, some voices are louder, better articulated and more powerful than other voices (16, 34).

Language, identities, habits and symbols are factors that may enable or hinder sense-making

In this sense-making framework, identity is about the understanding of self in relation to others, and identity is influenced by agency, expectations and the stories an individual tells themselves and others. The sense-making perspectives acknowledged that identity is not static, and that individuals may assume different identities and that the strength of their association with an identity depends on their agreement with the enduring narrative of the group. For example, a nurse manager that is speaking to a parent may assume the identity of nurse, manager or mother (34).

Language is a symbolic action that reflects the everyday reality of those using it, with stories being subjective and intersubjective accounts of experience that maintains the ECs culture (34).

Sense-making always occurs within a temporal/spatial context

The Sense-Making Methodology (Section 2.7, page 27) describes a squiggly human travelling through time and space, whereas Weick refers to a cosmological event to indicate that issues are disrupted in time and space (36, 47). Both the squiggly human and the cosmological event demonstrates the concept of time/space, motivating that sense-making is a dynamic process with unpredictable outcomes.

When action is taken, the situation is changed, and this may signal the need for the next moment of sense-making (or updating of sense-making). Even though sense-making is contextual and situated in the present, it acknowledges that the actions and assumptions regarding the situation are influenced by the past. And as the forward-motion continues, sense-making might require updating (37).

2.3 Epistemology

Knowledge varies from moment to moment and, essentially, people gain knowledge by acting themselves into understanding (3, 52, 53). Further, knowledge is subjective and context-specific, so various people facing the same situation will express different truths about it. Their perspective is influenced by factors such as their role, identity and attitude. In groups, the ability to effectively manage a situation depends on whether it is possible to leverage diverse perspectives into a shared purpose (15, 43, 44, 48).

Meaning and knowledge is socially produced and shared via stories using specific words, routines, interactions and – more formally – rules and procedures (26). Weick and Snowden view the work setting as an independent entity with its own collective mental frameworks because it consists of various individual and organisational identities e.g. doctor, nurse, manager, employer, employee. Both caution that when the various identities are not aligned, there is a risk that sense-making will collapse (16, 17).

2.4 Ontology

In complex, dynamic environments discontinuity, flux and ambiguity are normal occurrences and there are always gaps in what is known about the current situation, i.e. reality. Reality is not static; it is subjectively created and always unfolding (15, 47). An individual will hold a perception about the reality and the knowledge gap that they are currently facing. The

perceptions are influenced by their comprehension and beliefs e.g. how they view management and power structures. The combination of experience, perception and view are referred to as mental frameworks (11).

Mental frameworks are continuously reinforced, thereby forming a so-called bounded reality that is endorsed by social networks and plausible narratives. These frameworks and narratives can be challenged to remould the current reality – potentially impacting on contextual knowledge, understanding and decision-making (42).

Failure to adapt to situations may occur if people are 'stuck' in a mental framework and not updating their sense-making. There is ample evidence in crisis literature of updating failures in which the initial sense-making is now 'outdated' (54). For example, prior to the 9/11 terrorist attack, despite receiving warning signs that the 'reality' has changed, the Central Intelligence Agency (CIA) officials did not update their mental frames, therefore they failed to recognise the warning signs and thus failed to respond to cues regarding the imminent threat of a terrorist attack (46).

2.5 The process of sense-making

Organisational Information Theory and the Sense-Making Methodology are viewed as communication theories that offer insights regarding the processing and exchange of information between people. Even though the quality and quantity of information are instrumental, sense-making perspectives are more concerned with the meaning attached to information and what is noticed or not. Pertaining to the communication of the information, sense-making is more concerned with the motives and capacity of the communicator than the intricacies of the dissemination method (37).

By accepting that individuals have different capacities and ways of interpreting the same information, sense-making fully acknowledges that the individual's agency, world views and identities, amongst other factors, impacts on their interaction with information informing their communicative practices. Another aspect that influences sense-making is the structure of the environment i.e. the rules and resources that are available.

Sense-making is thus confounded by the ongoing tension between agency and organisational structures, e.g. rules, policy, bureaucracy and hierarchical position. In work situations, the formal organisational structures may determine collective sense-making and it is likely that cross-boundary collective sense-making occurs despite the formal structure of an organisation. Stacey refers to these 'informal ways' of dealing with change in an organisational setting as the 'shadow organisation'(55). The shadow organisation is created

by social relationships and is self-organised and not dictated by the formal structures. Weick alludes to the importance of the 'informal ways' by stressing that in organisations that are able to avoid catastrophe, it is often due to the strength of the social bonds that the organisation is able to respond appropriately (40).

There is tension between the formal and the informal (shadow) organisation and depending on the nature of the tension, it could harm or benefit sense-making. It could cause harm if, for example, should people feel unable to voice their observations in the formal structure, they could rather channel their annoyance via rumour and the grapevine. It can benefit sense-making when the informal organisation is strategically utilised by management to improve the responsiveness of the system. This is because informal systems are often viewed as more adaptive and responsive at an operational level (55).

There are certain preconditions or steps to sense-making, e.g. the sense-making needs to notice a change in the situation or environment. The process of collective sense-making described by Weick, Sutcliffe and Obstfeld is detailed and is used as an outline to describe the rest of Section 2.5 (7). The process of sense-making as described below was used to inform the survey questions in the SenseMaker® framework (Section 4.5.2, page 78).

2.5.1 Flow and flux in the environment

There is an unending flow of raw data/information into the environment. The data are overwhelming and ambiguous, making it impossible and unnecessary for people to notice and react to all of it. Therefore, people tend to scan and select certain cues, or strings of cues, from the flow. A cue is any signal, variance or occurrence that tends to stand out as abnormal in relation to what could be expected (7, 15, 37).

One way in which flux is created in the EC is that the patients and other visitors can access the EC via various routes, whereas in the other hospital wards there is normally only one access route. The patients that arrive at the EC are undifferentiated and they arrive at any time, whereas in the hospital wards the patients are admitted with a diagnosis and baseline interventions might already have been done. In some wards e.g. the surgical ward patient admission is scheduled. Due to the unpredictability of the EC, the workload is highly variable, interrupt-driven, the signal-to-noise ratio high and multi-tasking is the norm (56-58). Different team members and roles will view different cues or pieces of information as important. Further, the EC team members need to constantly make sense, determine their next action and whether the incoming data/information justifies an interruption and/or reprioritisation of the current task. Should they notice a new cue that could be of importance

to other professions or role players, they need to make the call on whether and how to inform them.

2.5.2 Selecting a cue

The ability to sense subtle cues or patch together strings of cues are especially crucial in complex domains, and not detecting variance may result in failure and crisis (32). What is deemed note-worthy depends on the attachments to assumptions and prior conditioning. The organisational structure strongly influence what is considered intervention-worthy or what is to be ignored (7, 48, 59, 60).

People only notice what they have been primed to scan for, and they can become blinded to other signals – even if the signals are obvious or life-threatening. How the organisation/management treat people when they respond to operational issues will determine whether people feel psychologically safe to 'notice' abnormalities.

Selectively ignoring cues that shout 'danger' is referred to as inattentional blindness; this is more likely to occur in environments with information overload and fragmented social cohesion (9, 11, 16).

2.5.3 Categorisation

As soon as a cue is noticed as different or abnormal, the mental framework kicks into action to justify or rationalise this occurrence. It could be done by rechecking what was noticed, searching for more information e.g. referring to institutional resources or consulting with experts, or accepting it without further intervention (7, 59). The cue is now crudely categorised e.g. as a good sign or as a reason for concern (59). The label attached depends on formal rules, past occurrences and novelty of the cue (42).

Once justifications are accepted and shared as the truth, people become blinded to alternatives and won't deem their 'truth' as contributing to subsequent error. It has been shown in accident investigations that groups will continue to justify their faulty group logic even if there is mounting evidence against it (61).

A related risk is that groups become so over-committed to their rationalising and labels e.g. 'not our problem/job' or 'never tell management', that they might unwittingly sabotage other groups (3, 15, 59).

2.5.4 Mental frameworks/patterned thinking

People respond to situations based on their beliefs of how things work, yet their theories-in-use may contain contradictions and error (46, 48). Belief networks or mental frameworks are temporary, pre-conceived perspectives that inform all behaviours; and in turn, the consequence of their actions will either result in reinforcing, adjusting or abandoning the framework (15, 48). In this way, mental frameworks create a powerful bounded reality that informs interactions (8, 62).

The data/frame model (Figure 2, page 22) is embedded in psychology and naturalist decision-making with the model describing the cognitive characteristics of sense-making. In this model, sense-making has an endpoint which is the identification of a suitable mental-frame. However, the other sense-making perspectives (including Klein's later work) infers that sense-making is ongoing and the sense made in one moment may be outdated in the next moment. Ongoing sense-making implies that the mental-frames cannot be fixed. In fact, in an environment where multitasking is normal, people are required to apply various mental frames at once (54).

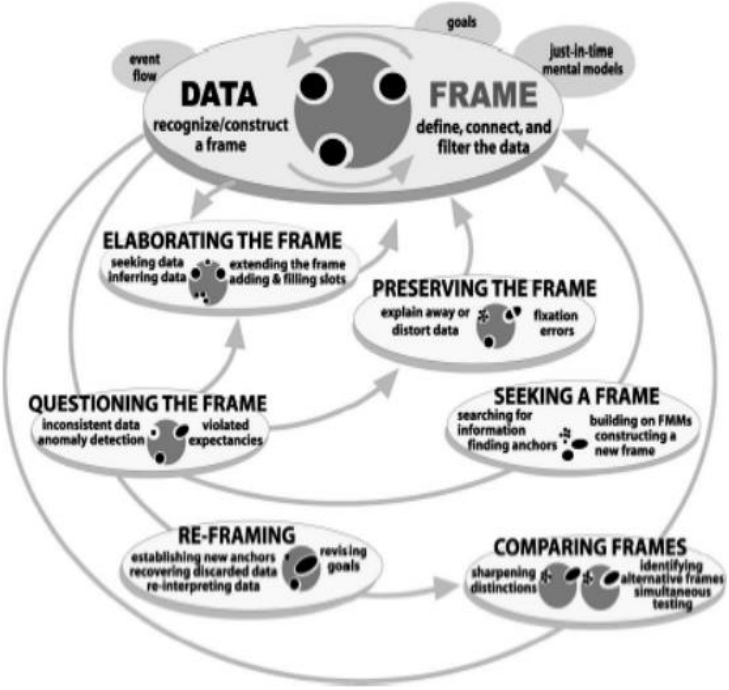
Human neurobiology augments the premise of the data/frame model. According to neurobiology, the pre-frontal cortex is responsible for the highest order cognitive abilities e.g. flexible thinking and decision-making. It generates 'working memory' of past situations, what happened and what worked. However, the pre-frontal cortex is highly sensitive to stress exposure and during a crisis or when experiencing strong emotions, the responses from the pre-frontal cortex can be rapidly impaired. This affects the ability to perform tasks that require flexible thinking, and in certain conditions stress exposure can improve performing well-rehearsed or simple tasks (49).

It can be assumed that during stressful times in the EC, individuals are likely to revert back to rigid, habitual responses i.e. preserving a mental frame without taking on the energy to question, reframe their observation or seek more information (49).

Despite providing a simplified view of only applying one mental frame with an end-state to sense-making, the data/frame model (Figure 2, page 22) still offers a reliable relationship between data including cues, signals, events or situations and the mental frameworks that help to explain the data (63). People use an existing mental framework to make sense and act on data and, simultaneously while acting, may adjust or justify their mental framework to explain the outcomes of their actions (10, 63). Because mental frameworks are temporary perspectives, the sense-makers can remain static in a current frame by strengthening and preserving it or explaining away anomalies. And as explained above, remaining static in a

frame is more prevalent during times of stress, which are the times when more flexible mental frames are required (48, 64).

Figure 2: The Data/Frame model (63)



Within the EC, people share mental frameworks about the environment, how things work and how to react; these influence when and how they collectively make sense of the environment (65). They share their frameworks and expected behaviours via shared stories, language e.g. using metaphors and dialogue. When faced with a situation, they can 'frame' the incoming information (data/cues) by elaborating i.e. searching for more information. They could also question a framework by disagreeing with the team decision or reframe the information by revisiting either the data or the existing frame. Another way of dealing with the information is to compare it with past occurrences, seeking something familiar to help them hook the information onto a previous experience or what is known. Whatever mental frame that they choose will determine the next actions.

Included in the mental frame is the perceptions people hold regarding the consequences of speaking up, voicing disagreement or sharing information. These views on psychological safety will determine whether they would seek clarification when unsure and if they would share their insights (13).

Stereotypes are a type of mental framework where certain theories or expectations are held (e.g. beliefs about opposite genders, races or cultures). Broadly speaking, doctors and nurses

have stereotypical beliefs about their professional role and the roles of others, with deeply embedded expected behaviours that may inform their interactions (66). Stereotypical beliefs and behaviours may impede interprofessional collaboration. A study by Sollami et al. found that stereotypical beliefs that may be harmful to interprofessional teamwork already exists early in professional training. In their study 356 first- and second-year Italian students in healthcare completed a survey based on the Students Stereotypes Rating Questionnaire and Readiness for Interprofessional Learning Scale. The findings showed the presence of stereotypical beliefs that nurses are warm, socially competent, but less clinically competent and autonomous than doctors; whereas doctors were viewed as agentic, clinically competent and autonomous but less socially competent and communal (66).

Stereotypical expectations have an impact on teamwork, for example, it could impact whether nurses would question a frame offered by the doctors, as the nurses might not think they have enough agency and/or competency to question a doctor.

2.5.5 Acting

Actions take place slightly ahead of cognition and, in dynamic situations, actions are taken via first-fit options and pattern-matching – rather than the deliberate consideration of alternatives (3, 41, 43). As people respond and current information are transformed, new gaps are created in their knowledge. These gaps are bridged with more actions e.g. taking control of or filling the gap with assumptions (15, 50, 51).

In dynamic environments, where all actions are interrelated, team members may choose to bridge gaps via collaboration or obstruction, so as to share or withhold information from others (16). Collaboration is more likely to occur when social cohesion is valued by the existing mental frameworks and belief systems (26).

Doctors and nurses i.e. the interprofessional team may have different ideas of what constitutes collaboration, and there is a possibility that doctors may view collaboration to be present when the nurses follow their orders, rather than when they and the nurses are reciprocating opinions and observations on operational (and clinical) matters. Various studies refer to the so-called ‘doctor/nurse game’, where nurses do not to speak up nor collaborate, preferring to express their unvoiced views via silent opposition, obstruction or fuzzy suggestions. The concern and reason why it is mentioned under the heading ‘acting’ is because from a sense-making perspective, withholding information or silent opposition constitute actions, and the nurses (or other team members, including doctors) choose the

action of non-participation where this type of obstruction carries potential operational and safety consequences in the work-setting (67-69).

These 'obstructive' actions and behaviours might be conditioned, as nurses are still trained to be subservient, and they might feel that their inputs are not required/do not matter. This has to do with agency, which is the capacity to act, with an emphasis on 'power' to act. The nurses might not feel empowered to speak up, the danger of the powerlessness, whether true or perceived, is that the nurses might only be noticing cues that they are 'allowed' to respond to or solve (1).

2.6 Factors influencing sense-making

The above section described the 'steps' in the sense-making process, and the attention is now turned to factors within the team that could influence sense-making. These are probabilities that may enable or inhibit sense-making and are all influenced by organisational structure and agency. The factors were reduced to six by only describing the overlaps between the Sense-Making Methodology as described by Dervin and the process of sense-making (7, 40, 42).

2.6.1 Ideology and beliefs about power

How the group views their importance, the power to influence and status in the organisation will shape their actions and interpretations. People have highly intricate theories of power, their capacity to act (agency) and of those in power (1, 8, 42). Ideology encourages or discourages social relations, accepts or discredits what is believed, and determines the criteria for plausible stories and the authority to act. It is constantly reinforced in various ways, e.g. visibly by rules and disciplinary codes, or subtly by power relations that make use of exclusivity, jargon, symbols or routines (42).

Those that fear or revere power may not openly voice disagreement and anomalies, because these actions are deemed risky or because they assume that those in power are all-knowing. Some people become over-reliant on power figures, abdicating their obligations, becoming blinded and simply following the 'accepted' ways of doing things without questioning it (42, 59, 70). Those in power positions can, directly and indirectly, influence whether people will feel 'safe' to solve problems when encountered and speak up if they notice anomalies (71, 72). Ideology, however, can also enable collaboration and interaction – by endorsing throughout an organisation that different roles and levels of power offer divergent insights on the same situation and that all insights are important (8, 59).

2.6.2 Feelings and identity

Situations elicit emotions of varying intensity that contribute to the overall ambience of the EC (26). Strong emotions may interfere with the ability of the team to sense cues, categorise them and interact appropriately (4, 48, 49). This has been confirmed in human studies that considered the changes in brain activity during exposure to stress, such as when people perceive that they have lost the ability to exert control in a situation (49).

People use identities to differentiate themselves from others and to show their allegiance to a group, but identities are confounded by individuals simultaneously holding more than one identity at a time, which each have a predisposed mental framework (e.g. related to ethnic group, gender and/or profession) (17, 34). In diverse groups, the number of identities and sub-groups may lead to fragmentation, silos and isolated mental frameworks between social groups (Section 2.2.2, page 14).

In the EC, and healthcare in general, interprofessional integration is threatened by overly strong associations with professional identity (16, 42, 66). Doctors and nurses are expected to act in accordance with a professional identity, which has established methods reinforced by organisational structures and regulatory bodies (73-75) (Section 2.5.5, page 23). These islands of strong professional identity groups may lead to fragmented sense-making and tension between the groups, which would be better off if they shared knowledge and collaborated (40, 74).

2.6.3 Social mechanism

Management may be responsible for determining the formal processes of an organisation, but the real gatekeepers of 'how things are done here' are the informal networks - also called the shadow organisation - that enforce the workplace culture, promote or prohibit teamwork, and guard local knowledge, resources and information flows (76, 77).

Social practises encompasses the recurring and regularised actions of individuals in a social system, these interactions are continuously creating and recreating that system (78, 79). The social system represents a patterned network of the (informal) relationships within the organisation (80). Informal networks are unsanctioned, often highly trusted networks and the volume and strength of their numbers often determine their ability to exert power (76). The ties within a social network determine its external relations, and over time social networks become institutionalised, routinised and hold strong identities of their own (28).

Social networks are strengthened by regular interactions; there is a link between the design of social spaces e.g. tea rooms and the frequency of interactions within such spaces. Social

systems persist partially because of the adherence to the established rules and routines, but also because people functioning within the systems have agency to do so via the established practises within the organisation. Resilience is derived from the informal ties that make social networks an important and underutilised resource in most dynamic environments (4, 81).

2.6.4 Plausible stories

Essentially, sense-making is about interactions with and assumptions about information. Plausible stories are those that have been accepted as true and reinforce various actions and beliefs (11, 34, 40). Because reality is socially constructed, the reality and truths held in an EC is an overarching narrative of collective stories, identities and assumptions that flow within its networks (82). Commonly accepted stories become embedded in the social practises over time and may enable or constrain activities, decisions and sense-making (78). Truth is merely a matter of the best-informed consensus reached at that time (83). Team members often consider informal stories, e.g. from the grapevine, more plausible than formal channels (84). Furthermore, different networks may hold disparate plausible stories, and these become the network's story. As newcomers join the network they are indoctrinated into its boundaries, plausible stories and ways of doing things; this happens regardless of the formal rules (16, 24, 26).

By paying attention to the current informal stories, insights can be gained into the prevailing ideologies, networks and communication methods of a group (84, 85). What is informally communicated reflects what people in a group find important and valid, and this will be preserved without question for as long as it serves the 'believers' (34). Notably, it has been shown that tapping into informal networks allows for paradigm shifts in how an organisation fundamentally operates (41, 76).

2.6.5 Communication

Organisations prevail because of their daily networks of communication and overlapping routines. Knowledge is communicated by means of a variety of social processes – some formal e.g. policy, procedure, written rules and some informal e.g. unwritten rules, conversations and routines (15, 41). The socially constructed work setting often goes unquestioned (7).

Stories remain a principal mechanism for the transfer of knowledge, while social networks are shaped by the stories told (41). Even within formal communications, ingrained connotations may influence ideology, ambience and connections (17, 40).

Communication is a symbolic aspect of the organisational culture, with the language, jargon, tone and channel of communication used to convey meaning (83).

2.6.6 Feedback loops

Mental frameworks and behaviour are influenced by the strength and methods of the feedback received. The plausible stories employed by teams don't always constitute an optimal way of acting on a situation, yet good feedback loops help to illuminate these stories – allowing for reflection, lessons learned and the updating of justifications (26, 64).

Because feedback loops enable adaptive capability, effective ones form a key contributor of the long-term survival of organisations whereas poor and fragmented feedback loops are a common cause of failure and malfunctioning systems (21, 86).

2.7 Synthesis of the four sense-making perspectives

In Section 2.5 and 2.6, the four sense-making perspectives were fused into one process of sense-making. Now, the key tenets of each are interpreted in more detail. Figure 1 (page 13) shows the main area of interest covered by each sense-making perspective e.g. Dervin described the Sense-Making Methodology.

2.7.1 The Sense-Making Methodology described by Dervin

Sense-making is a communication-informed methodology that is strongly informed by critically orientated, social and communication theories (20, 44). Individual sense-making is dynamic, sophisticatedly interacting between perception and sense-making, where *verbing* is used to highlight interplay e.g. negotiating the truth or making assumptions (36, 42).

The Sense-Making Methodology is described via a metaphorical framework; the central metaphor is a squiggly human being travelling through time-space while encountering discontinuity (Figure 3) (36, 42, 47). The human is depicted as squiggly to represent that order and disorder simultaneously exist in every individual. When the squiggly human enters, for instance, an organisation, their history, memories and experience accompany them and tension may arrive between their 'baggage' and their interpretations of the rules and expectations regarding behaviour (36).

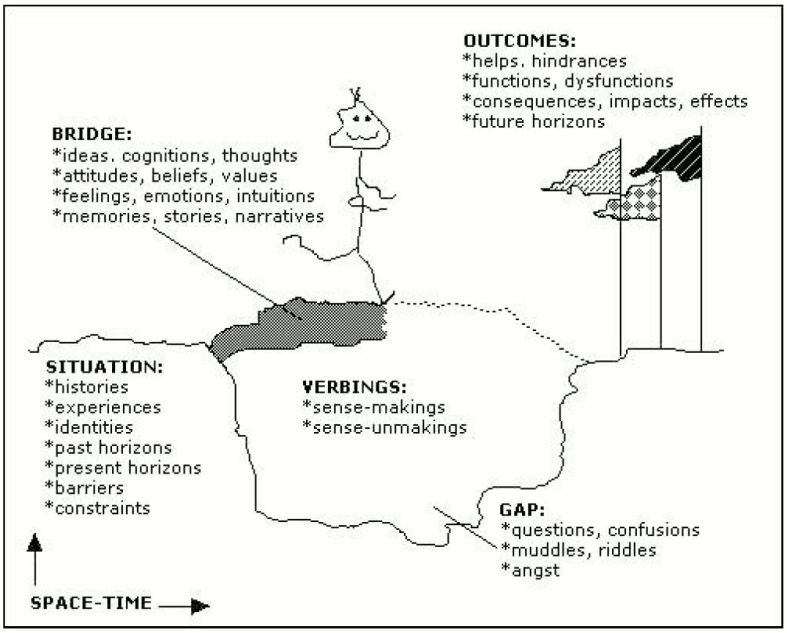
Squiggly humans make sense via metaphorical gap-bridging, and the 'bridge built' can be internal i.e. cognitive, a shift in the mental frame; external i.e. following procedure, or it could include aspects of both (36, 87). For example, the gap could be a discrepancy between their experience and the current situation. To bridge the gap, they could seek advice, they could

choose to ignore the discrepancy and continue based on what worked previously, or they could gather more information about the current situation to frame it better (Section 2.5.4, page 21).

The metaphor illustrates that sense-making – how it occurs within a spatial-temporal context – is simultaneously situated yet transitional (36). Temporality refers to the history and the timing of a situation, while spatial refers to the interconnectedness, feedback and interdependence between one situation and others. The spatial-temporal context is one of the core strengths of sense-making theory because linear cause-and-effect theories tend to isolate static conditions. Within the spatial-temporal context, sense-making occurs despite cognitive gaps that are simply bridged by what appears plausible (37).

In the Sense-making Methodology, information and knowledge are malleable and the individual can mould it to fit their understanding. That said, there is an interplay between agency and structure, meaning that the individual is never completely free to act as they want, and neither are their actions always prescribed (20).

Figure 3: The Squiggly human: The metaphor explaining the Sense-Making Methodology (36)



Structuration theory is a highly abstract theory that describes structure and agency as mutually dependent and inseparable dualities that interact with each other in social systems (1, 79). One of the ways in which the influence of structuration theory on the development of the Sense-Making Methodology can be seen is the explanation of gap-bridging – as the agent interacts (agency) they actively shape the rules and resources (structures).

Agents can tap into the structures knowingly e.g. following policy, and unknowingly e.g. acting in accordance with the taken-for-granted assumptions or unquestioned plausible stories in their social system. Evidence of the rules and resources are found in the daily activities, routines and the stories that people tell about their workplace (78). Sharing insights are a vital aspect of sense-making with concepts including 'reality', 'truth' and 'knowledge' constantly being structured and restructured, produced and reproduced. It should be mentioned that the Sense-Making Methodology makes no distinction between the effects of structure and agency (20).

2.7.2 Linking decision-making and sense-making

Naturalistic decision-making (NDM) emerged in the 90s as an empirical knowledge-based approach that builds on cognitive psychology. NDM studies actual situations to expose the decision-making strategies used within them (32, 43, 88). Klein describes the cognitive tools people use when making intricate decisions in dynamic, typically complex domains e.g. the military, firefighting and healthcare. It has been demonstrated that effective decision-makers are able to concurrently apply various macrocognitive tools (32, 50).

In dynamic environments, there are several context-specific variables that will impact the ability to sense and react to cues. As soon as action is taken, these will impact on the context and in these environments, there is often no single right answer. Sense-making in a dynamic environment are considered in the Prime-Recognition-Decision (PRD) model (Figure 4), as well as the Data/Frame sense-making model (Figure 2, page 22)(18). Non-deliberate sense-making occurs when decision-makers commit to action, without conscious thought or consideration of the available alternatives. They rapidly categorise cues, matching them to previous patterns and/or mentally simulating outcomes; as soon as they have determined a workable option, they satisfice and act (32, 43, 53). The PRD model has been based on research conducted among fire commanders and it is deemed particularly useful in dynamic environments (43, 51).

Figure 4: The Prime-Recognition-Decision model (43)

The model consists of three stages: an initial stage of perception and noticing a cue, the recognition or categorisation of a situation and the stage when a response is generated.

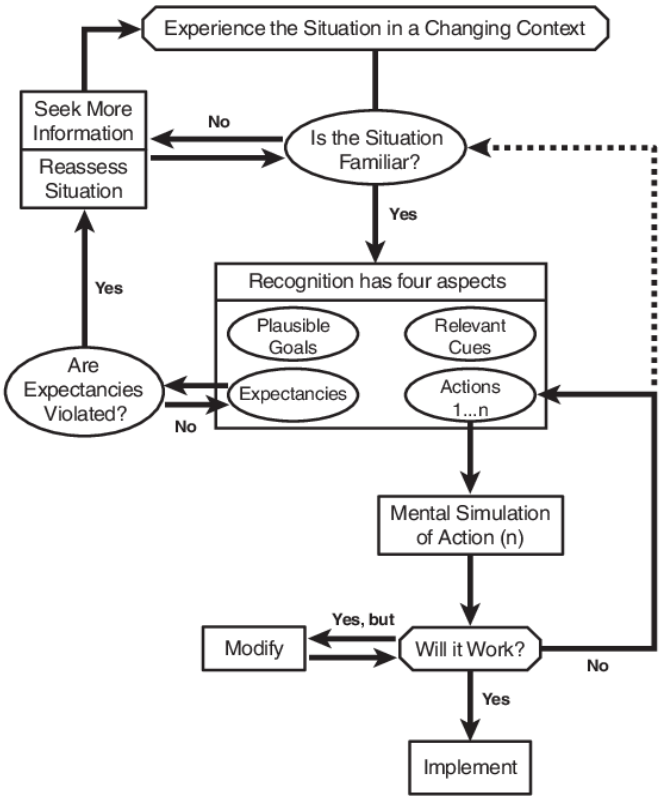


Figure 4 shows that there is a difference between sensing that something is wrong/changing (problem detection) and identifying the problem. Thus, effective sense-making requires cycling between searching and selecting cues while reframing and adjusting mental frameworks. Picking up cues is as important as applying an appropriate mental framework to sense-making, interpretation and problem detection (89). Therefore, an open mind that can replace the current assumptions – if required – is preferable to being overly attached to a plausible story, or blinded to specific cues (48).

Expert decision-makers can sense variation, act, yet keep an open mental framework that allows them to constantly adapt data and frameworks via constant pattern-matching (48).

2.7.3 The role of expertise

"Novices see what is there, experts see what is not there" (90).

Years of experience do not equate to expertise, superior cue detection or decision-making skills. Instead, an expert is a person who has exposed themselves to various experiences and

actively fine-tuned their tacit knowledge – thereby obtaining advanced cognitive skills and open mental frameworks that allow them to adapt quickly during dynamic, complex situations (18). The expert spends time learning to be an expert.

Experts and novices (or non-experts, despite years of experience) use different sense-making strategies, where novices consistently apply extensive long-winded and linear decision-making routes (18). Experts, on the other hand, dig into their rich collection of patterns and previous exposures to sense and match cues; most of which are imperceptible to the novice. Thus, novices and experts have disparate perceptual-cognitive frames – where the expert is sensitive to subtle, typical and atypical cues and is able to visualise potential outcomes (90). Christianson considered the updating of sense-making in a simulated clinical emergency and found that teams that are able to adapt and re-make sense had at least one more expert member on the team than those with ineffective updating of sense-making (54).

To become a highly-skilled sense-maker requires prolonged practise, exposure and feedback (91). The environment needs to enable the decision-maker to learn and become skilled. Optimal learning conditions include the ability to apply knowledge and the presence of rapid feedback loops. There is also the precondition that a relationship exists between the various cues, actions and their consequences. Finally, becoming an expert in decision-making requires practice and the necessary personal skills e.g. self-awareness (53).

Experts satisfice, yet they are able to remain open-minded and can adjust their mental frameworks as the situation unfolds (11). In naturalistic decision-making, intuition is an expression of experience that includes many different patterns; these differ from laboratory setting decision-making models that zoom in on just one pattern at a time (18). For example, the PRD model (Figure 4, page 30) is essentially a combination of three decision-heuristics that occur simultaneously; all of them have been described as separate occurrences in the studies on heuristics (32).

2.7.4 Rational choice and dual-process theories

Acknowledging expert intuition as a decision-making strategy contrasts strongly with the heuristics and bias schools because these view intuition as a cognitive shortcut (heuristic) that leads to bias and error (53). The prospect model theorises that error arises when people use cognitive shortcuts; scholars from this school of thought remain highly sceptical of expert intuition, asserting that it can prove inconsistent, unreliable and error-prone (11, 53, 91).

Rational choice models state that people will consider all relevant alternatives, consequences and probabilities prior to making decisions, whereas the dual-process theories describe two

cognitive processing models – a fast, automatic and non-conscious model and a slower, more controlled and conscious model (92).

The difference between these and naturalistic decision models is that the prospect and dual-process theory was developed in laboratory settings. Naturalistic decision-making considered active processes e.g. sensing cues, information seeking, and situation assessment as opposed to zooming in on option selection in an artificial controlled setting. It remains uncertain whether the findings of controlled decision-making studies are valid in naturalistic settings, where variables such as experience, context and the repercussions of the decision may impact the accuracy of the models (53). Comparing the accuracy of decisions with optimal linear combinations may also not be applicable in natural settings (18).

2.8 Organisational sense-making

Shifting from the Sense-Making Methodology and sense-making during dynamic events e.g. fighting a fire, the attention is now turned to the organisation. Why are some organisations able to adapt to massive insult and continue operations despite an unexpected crisis? How are they able to prevent failure, adapt to circumstances and continue, even thrive? And how does this differ from those organisations that suffer catastrophic failures? This is what the work on high-reliability organisations (HROs) sets out to determine.

Weick studied crisis situations (those leading to catastrophic consequences) across various industries (3). He states that the ability to adapt to fluctuation, and the subsequent revelation of resilience, is largely dependent on an organisation's pre-existing structures, social cohesion and collective sense-making skills. HROs employ collective and simplified mental frameworks that are often revised and they remain preoccupied with anomalies and variance (3, 7). Adaptive capability is situated at the operational level and is achieved through vigilance for abnormal cues, rapid responses to emergence and the presence of strong feedback loops (Section 2.10, page 46).

Organisational reliability is reduced as soon as the capacity to notice cues or the ability to respond to them is inhibited. Some of the ways in which it could be inhibited is by organisational structure, management behaviour and mental frameworks of the team. The risk of operational failure increases steadily when people follow the rules blindly, sticking rigidly to plans and policies, because this renders them unable to respond dynamically to environmental cues (3, 93).

Another risk related to operational failure occurs when an operational team experiences ongoing safety crisis, that remains unacknowledged by top management. The daily 'firefighting to survive' tends to deplete operational capabilities (26, 59).

Dynamic systems experience constant flux and change, and resilience can be described as their 'bounce-back rate' or ability to adjust and continue functioning reliably despite fluctuation. As mentioned earlier, resilience is a by-product of social interaction and HROs mindfully nurture resilience because it prevents failure (16, 81).

HROs acknowledge that sense-making should be distributed between heterogeneous groups, and that all groups should actively anticipate cues, updating knowledge and remain open to challenging their mental frameworks (59). By enabling feedback loops, where multiple perspectives on the same challenging situation are shared, both resilience and the ability to adapt are strengthened. This is where crucial overlaps can be seen in the positions held by Klein and Weick; both advocate that the detection of change is a key element in sense-making, and they further acknowledge the important role of expertise and real-time adaptive capability (15, 48).

Enabling the above requires an organisational structure that permits flexible responses at operational level i.e. flexibility as opposed to sticking to rigid rules.

2.8.1 Organisational structure

The organisational structure is foundational to all organisational activities and is integral to adaptive capability, resilience and reliability. In South Africa, the bureaucratic structure remains the hallmark of governmental administration (94). Hospitals are designed around discipline-based specialities, which are divided according to specialisation e.g. operation theatre or paediatric ward. In the traditional model, each functional ward is overseen by a nurse manager who has in-depth technical knowledge of the function, while the specialist physician remains external to the operational management of the ward, only flowing in and out according to clinical load (30, 94).

Four principles of the bureaucratic structure that pertains to South African hospital design are discussed and critiqued in brief below.

Bureaucracies consist of various levels of hierarchies and departments, coordinated by a clear chain of command with control and authority centralised at the top. Bureaucracies are particularly efficient during stable steady states, where routine and repetitive functions can be standardised to ensure reliability (84). A steady-state exists where there is minimal flux, unexpected or unknown variation. But dynamic environments are inherently unpredictable,

complex and ambiguous. The same structures that work well in stable conditions and environments may become restrictive in dynamic conditions and environments. This is due to the core principles of structures that have been designed with steady operations in mind.

Principles of bureaucracies

Formal hierarchy

Formal hierarchies allow control via a clear chain of command, where every level is linked to the level above. Authority, power and decision-making, therefore, flows down from the top of the hierarchy (12, 14).

A hierarchy is visually represented on the organisational chart – a diagram that depicts positions and where lines are used to depict subdivisions, reporting structures and authority; departments are shown as isolated horizontal boxes, linked vertically to higher levels of command, all the way to the top, where the highest authority and decision-making power is centrally concentrated.

Architecture is another symbol of organisational structure, signifying clues to the accepted mental frameworks, e.g. a geographically removed head office. Bureaucracies purposefully use architecture to situate different hierarchies and functions in distinct physical spaces. This enables physical and social boundaries that demarcate the acceptable information- and social networks; Lega argues that, in hospitals, the physical layout endorses the presence of professional silos (28, 30).

Framework of rules

Hierarchies apply rule-based, controlled and consistent management methods that are reinforced by standardised documents containing the policies, procedures and rules related to every eventuality. Standardisation establishes a level of conformity through uniform practises, and people are expected to always act within the defined parameters of their role by following these standardised rules, policies and procedures (14).

Functional speciality

Departmentalisation refers to the logical grouping of jobs, as shown on an organisational chart. Functional specialisation and professional hospital bureaucracy enable domain/departmental specific knowledge (30). Each functional team is likely to hold different pieces of knowledge, while overall knowledge is integrated at the top (74). Bureaucracies are

designed to have limited horizontal integration between departments, where each one only receives information pertaining to their job (14).

Purposely impersonal

Bureaucracies favour environments that are impersonal, objective and consistent, instead of those based on personal relations and social cohesion. The reasoning behind that is that impersonal environments equalise everyone in a job category (14). The environment is intentionally cultured via top-down communication, departmentalisation, standardisation, centralised decision-making and the rigid, depersonalised enforcement of rules (84). Furthermore, bureaucracies safeguard an organisation by employing generic routines, allocations and strictly enforced rules, where people are interchangeable and easily replaced when they leave.

Shortcomings of this structure in dynamic environments

Bureaucracies function optimally in stable conditions where consistency, standardisation and clear chains of command are possible. In healthcare, a strength of functional specialisation is that it helps to progress domain-specific knowledge (30). However, the advantages become obstructive when the environment is volatile, uncertain and complex; here, bureaucratical structures constrain resilient and reliable operations (14).

Shortcomings include how arduous it is to move information – where it requires rapid feedback – through the chain of command to the top, and how this directly reduces operational flexibility to respond to an unfolding situation (12).

In some bureaucracies, management overzealously enforces the rules, disempowering those lower down the hierarchy from applying their discretion. In time, these staff members become complacent, lose personal involvement and blindly follow the rules regardless of the situation and/or warning signs (12, 84). In dynamic situations, when people blindly follow the rules and ignore situational needs, a situation of organisational vulnerability to failure is created (59).

The presence of pockets of isolated organisational specialities has its strengths, especially in large governmental bodies where command and control can be simplified. But the tunnel vision becomes problematic where there is limited context-appropriate information and reduced communication flows between these silos. It tends to lead to fragmentation and us-versus-them mentalities, which hamper coordination and reciprocity, and may even lead to rivalry for resources (9, 14, 30).

Centralised decision-making, especially in large bureaucracies, hampers collective sense-making. It creates a fallacy of centrality, where management may assume they are aware of everything that is happening, while becoming ignorant to some of the factors e.g. operational realities (59). If management then imposes rigid rules, they completely disempower the operational function to respond to emergence.

Knowledge-intensive and dynamic environments – such as ECs – may not benefit from strong bureaucracies. This is because bureaucracies foster inattention to emergence and it is possible that collaborative and flexible decision-making methods, which feature integrated management styles and a measure of the balance between the rules and an adaptive approach, are more appropriate in the EC (14, 84, 95).

2.8.2 Other organisational determinants

Continuing with the concept of the organisation, organisational culture is discussed as part of organisational sense-making. The structure of the organisation is only one determinant of organisational reliability. Another determinant that is closely related to the structure is strategy. The strategy represents the map of how an organisation intends to achieve its purpose and objectives, with systems tying structure and strategy together by outlining practices and controls e.g. inventory and budget systems (96). Systems are enforced through policy and procedures. When combined, structure, strategy and systems determine suitable managerial styles, staffing levels, organisational skills and the utilisation of resources. Some of these determinants, e.g. policy, are tangible and easy to measure, while others are intangible and harder to decipher from the outside (96).

2.8.3 Organisational culture

Sense-making is influenced by organisational culture. There is a tendency to use the terms culture and climate interchangeably, yet it is important to make a distinction as the concepts are measured and observed in different ways (97). Climate is a property of the individual, based on their individual perceptions regarding what the organisation is like in terms of practices, policies and financial rewards; and the impact of these on the work environment (98, 99). Climate is embedded in the physical look of the workplace and is experienced by visitors, clients or new employees upon entry (98, 100).

Culture is embedded in the social system, rooted in the organisation's collective history, symbols and rituals. Because culture is an evolved context that develops over time, it is more enduring than climate. Culture is produced through shared meanings, values, beliefs and

ideology (98, 99). Culture is produced through ongoing sense-making and it is embedded within the collective, patterned behaviours of teams (100).

People share fundamental assumptions about their workplace, the valid ways of getting things done, and acceptable social networks. These assumptions form a deep and mostly unconscious condition of the workplace, giving way to taken-for-granted beliefs and acceptable behavioural norms i.e. culture (5, 101). Again, some of these assumptions are tangible, while others are more obscure, e.g. separate tearooms for different disciplines that subtly communicate how things work in the organisation. These enduring intangibles and shared assumptions can make or break an organisation, yet they are the most difficult aspects to bring to the surface (64).

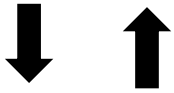
How culture is 'spread'

Culture takes hold via socialisation, which includes stories, language, jargon, gossip and rumour; it is dispersed formally and informally via stories that connect the past and the present (40, 64). Culture informs people of acceptable behaviours and a critical indoctrination into culture occurs when newcomers join a group or organisation and are provided with these plausible stories (5, 84).

Culture is a 'dynamic verb' that influences a group's selected cues, actions and plausible stories (5, 64, 101). It can be explored by capturing the stories told within an environment e.g. the EC (40, 41, 101). Paying attention to the stories of an organisation provides access into its shared mental frameworks and the assumptions that exist surrounding teamwork, professional identity, trust and – ultimately – the process of sense-making (40, 64).

Schein explains organisational culture as a multi-layered model that offers a useful framework to explore sense-making. The layers mutually reinforce each other, showing that culture in the multi-layered representation is a dynamic concept. Artefact, the first layer is essentially climate, that results from the espoused values (second level) and shared tacit assumptions (third level) (100). A laminated poster that stipulates the organisation's vision and mission statement is a good illustration of the multi-layered model. The poster is an artefact that gives substance and reminds people of the espoused values of the organisation. The different levels of culture are illustrated in Table 2, which shows that the visible and non-visible structures in the organisation have an impact on each other and that culture extends beyond what is visible. Due to the levels being entwined, all the levels should be considered when studying culture; and only considering one level e.g. visible artefacts (climate) will not appreciate the depth of the assumptions, underlying mental frameworks and social system.

Table 2: Schein's three levels of culture (64)

Level	Content	Characteristic
Artefact 	Visible organisational structures and processes e.g. organisational chart Dress code Written rules, policies and procedures	Visible Easy to observe Difficult to decipher the implication
Espoused beliefs and values 	Strategy, goals and philosophies Articulated management style Ideology Plausible stories and justifications	Not visible Embraced by people
Basic underlying assumptions	Taken-for-granted beliefs and mental frameworks Unwritten rules Ultimate source of values, mental frames and feelings that determine behaviour	Not visible Unconscious, include thoughts and feelings

Professional culture

There are subcultures within the overarching EC culture, e.g. doctors and nurses each portray a unique culture that is passed on to newcomers, with certain aspects of it remaining obscure to outsiders (66, 102). The two professions attract people with specific mental frameworks, which are further enhanced as they become deeper immersed into their profession; expected ways of behaving are further endorsed by regulatory frameworks and professional societies. Doctors are typically socialised to be autonomous practitioners, taking charge and leading, whereas nurses are taught to coordinate, participate and act as the patient's representative. The indoctrinated frameworks at times lead to conflict and potentially impede the development of a collective EC mental framework for sense-making (102).

Because healthcare professionals take individual responsibility for their acts and omissions, they might not share their lessons learnt from mistakes, creating a barrier to organisational learning (13, 72).

2.9 Organisations as complex systems

People use stories to frame and organise details of a situation, knowledge, attitude and behaviours. As soon as stories are accepted as plausible, they set the trajectory for future reactions to similar situations – often becoming the widely held generic mental frameworks or 'theories in use' across the EC, where people's behaviour is patterned in stories (6, 9, 41). When the stories are shared, they interact with other stories and amplify or dampen social networks' understanding, connections and collaborations (9, 16, 34). Thus, by paying attention to the narratives, we can explore their socially constructed realities and truths (17).

This helps to determine some of the more obscure determinants of culture and organisation. Snowden's contribution to sense-making and knowledge management includes both Cynefin, a conceptual sense-making framework, and the multi-ontological tool, SenseMaker®, that captures stories for pattern-matching in dynamic multipotential realities (17, 41).

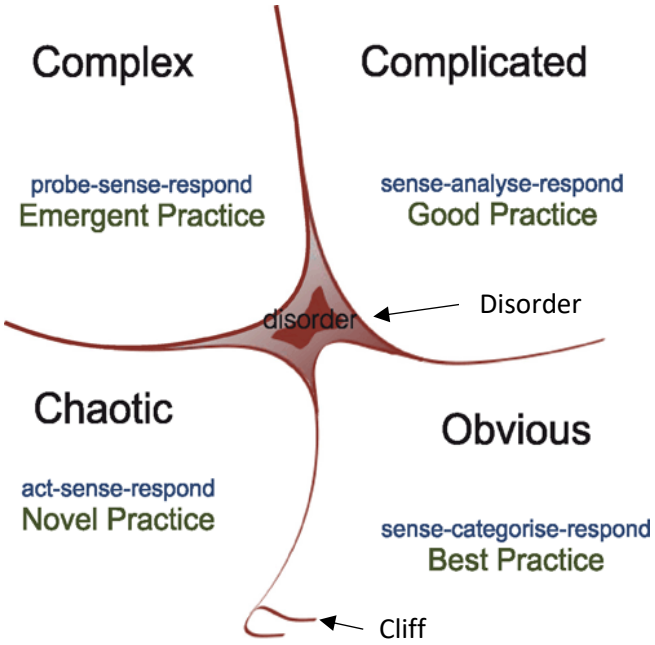
2.9.1 The Cynefin framework

Cynefin, a Welsh word with no direct English translation, refers to habitat or a place of multiple affiliations. The place of multiple affiliations refers to the multiple ontologies that people occupy at the same time and Snowden uses the term Cynefin to signify the variety of perspectives inherent in the workplace. His view is that all these realities can be comprehended by encompassing them, even the contrasting views, onto one framework (6, 9, 103).

The Cynefin framework has five domains, each requiring its own mental framework and sense-making mechanisms (104). The domains are summarised in Table 3 (page 41). Essentially, communication and understanding between multiple perspectives can be improved by applying the domain's appropriate mechanisms i.e. it helps in dealing with varying levels of comprehension during dynamic situations (105). In this way, the framework assists people in connecting with, linking to or challenging specific stories in their environment. The framework was designed for use in the complex domain, as opposed to tools used in the other domains e.g. cause and effect analysis (Table 3, page 41).

The Cynefin framework is conceptual; when generating a framework, the team first clumps together similar data points and only then adds emergent boundaries, ensuring that the data precedes the framework. This contrasts with categorisation frameworks, which tend to box or categorise data using rigid boundaries. Another difference between the Cynefin framework and categorisation frameworks is that the former takes into account the fact that there is no ideal domain i.e. situations are able to move between and within domains, allowing them to remain fluid and transitional (6).

Figure 5: The Cynefin framework (6)



The boundary between 'chaotic' and 'obvious' represents a cliff. This implies catastrophic failure, arising from complacency, and represents the most frequent collapse of sense-making (103). The symbolic cliff represents the danger of managing all situations as if they are obvious and can be dealt with in a linear way that may result in dysfunction and chaos. Recovering after falling down the cliff might be hard to rectify.

Disorder

A situation may result in Disorder, that is seen in the middle of the conceptual framework (Figure 5). Disorder is discussed separately because it implies that the situation needs deciphering or breaking the situation into smaller parts to reach a common understanding of the situation. Typically during disorder, there is no consensus, shared perspectives or common ground (105). Once a situation is dismantled into smaller parts, it is feasible that the parts may fall in different domains of the Cynefin framework.

Table 3: The four other Cynefin domains

Domain	Obvious	Complicated	Complex	Chaos
System/ontology	Order		Unorder	
Causality	Linear	Stable, but not fully known yet or known but too involved to have obvious answers	Agents and interactions defy categories	Not visible
Patterns	Predictable Straightforward	Predictable, but separated in time-space	Emergent or not repeatable Retrospective coherence	Turbulent, none
Connections	Strong between authority and subordinates	Strong between authority and subordinates	Strong between workgroup; the stronger they are, the easier it is to achieve stable patterns	May be weak
Constraints	Rigid	Governing	Enabling	No constraints
Sense-making behaviour	Sense situation Categorise situation Respond in a predetermined way	Sense situation Analyse Respond, based on expert advice	Probe to make patterns visible Sense the patterns Respond to stabilise	Act to reduce turbulence Sense Respond and move to either obvious or complex domain
Practice	Best practice	Good practice	Emergent practice	Novel practice
Dangers	Complacency Oversimplification	Overreliance on experts Analysis paralysis	Temptation to command/control Not allowing for emergence	Not abandoning control/command Missing chance to innovate
Sphere of	Checklists Process re-engineering	Systems thinking Cause and effect models	Complexity thinking	Disruptive innovation Crisis management

The framework is conceptual, and situations are contextual, meaning that what might appear complex in one situation or to one group, may become chaotic in another situation or group (106). One way to determine domains is by establishing the level of certainty and agreement within the team regarding a situation. Even though the framework is conceptual, certain situations in the EC are used to demonstrate the domains below. Care was taken to show how the situations could transition from one domain into another.

Checking of emergency equipment

Performing a daily check of the life-saving equipment in the EC at the beginning of each shift is an important EC routine. The checklist is standardised, and a responsible person is allocated on each shift. If they find any irregularities whilst checking, they follow the policy to report it. The importance of the daily check is undisputed and the consequence of not checking it could result in disciplinary action and potentially harm a patient. Thus, the undisputed best practice would be to check the equipment as per the policy at the beginning of the shift and it falls in the obvious domain of the Cynefin framework.

Ticking of the checklist could shift to the complicated domain should the allocated person be needed to assist with a patient-related emergency. The individual would now need to prioritise the here-and-now emergency against the best practice of checking the equipment for future emergencies. Options to deal with it includes further analysis of what would be the best option or seeking expert consultation with their senior.

The decision to delay the check, and thus transgress the rules depends on the available alternatives e.g. the availability of someone else to assist with either patient or equipment. To an outsider it may appear obvious that the patient should be managed first, however, not following the policy and the equipment not being ready for the shift carries a consequence.

Operating beyond capacity

When the EC operates at or beyond 100% capacity, the demand for resources outstrips the supply. There are various ways to alleviate the pressure e.g. shifting patients, expedited discharge, hospital support, diverting ambulances and requesting more human resources. In a complex situation, it is difficult to have a complete picture of what would be the best course of action, and it may differ depending on a combination of circumstances. Dealing with situations in the complex domain requires strong feedback loops, effective communication methods and, in this domain, the ability to test probes (potential options). Adapting to what is working is vital.

The same situation may result in chaos, for example when communication and coordination between team members break down. The situation could become more chaotic if the demand/supply mismatch is severe and/or when team members are solving issues in isolation.

2.9.2 Characteristics of CAS

This study considers the EC as a CAS where, due to the interconnectedness, the interacting components produce their own pattern of behaviour over time. Every interaction within the system affects change, yet simultaneously all interactions are to some extent constrained by the system (21, 106, 107).

The interactions create patterns, observable at a systems level, but obscured when viewing the parts in isolation (108). This makes the interweaved patterns of connections and interactions between the components more important than any individual component; this is referred to as interactive complexity and ensures continued functioning of CAS (35, 109).

Human systems form a specific type of CAS, that Snowden refers to as anthro-complexity (2). This distinction is made because, in addition to the other aspects of complex systems, humans have narrative and language. Further, humans tap into multiple identities to inform their behaviours. For example, a clinician dealing with an abused child may tap into their identity as clinician, carer, parent, educator or judge. Each behaviour represents a different trajectory and consequence; the ability to fluctuate between identities increasing the complexity, unpredictability and paradox of human systems (Section 2.7.1, page 27) (110).

In human systems, not only can people opt to occupy a specific identity, but they also choose to follow the written or unwritten rules of conduct, or they can choose to abandon the rules and make new ones (35). Consequently, people maintain a degree of freedom in choosing their actions, which implies the power to change and challenge structures and the system.

The consequence of actions is unpredictable and unintended

People act themselves into understanding, and the consequences of the actions are unknown prior to acting and may be unintended (1, 3). For example, if the EC is at capacity and an acutely ill patient arrives, there are various options e.g. keep the patient in the waiting room with limited oversight or move another ill patient from a bed to a chair to create bed space for the new patient. Whichever action is taken, the consequence is unknown and may unfold in various ways e.g. moving the patient results in other caregivers unable to locate the

patient, whilst keeping the patient in the waiting area might result in no oversight to notice a significant change in clinical condition ending in catastrophe i.e. patient death.

In CAS all components are interconnected

Not only does every interaction result in change, but the interrelations are non-linear with the system highly sensitive to change. Minor fluctuation can produce disproportionately major consequences. In the EC, the multidisciplinary team are composed of mutually influential components, each fulfilling a variety of interrelated processes. Even components such as agency and structures, e.g. rules and procedures, are mutually dependent and constantly influencing the other (1, 55).

The boundaries are arbitrary

Boundaries are arbitrary, contextual and permeable (106). It makes it tricky to discern which components are within the boundary of the EC system, and which falls outside. For example, if psychiatric patients are boarding in the EC – do they become part of the EC, or remain part of the psychiatric unit? And which rules and constraints apply to them and which not?

People create boundaries between themselves and others, and they then exert energy strengthening and maintaining their boundaries, e.g. within the EC, the day and night shifts may create and enforce boundaries that have an impact on the entire EC system.

Both examples of the EC above demonstrate that systems are always embedded within other systems, and they co-evolve together. However, co-evolving implies boundaries that are sufficiently permeable so that exchange is possible (106, 111).

Causality is dispositional and serendipitous

There is not straightforward cause-and-effect causality and consequence is non-linear and unpredictable, implying that outcomes can be novel and unanticipated (35, 106, 108, 109).

With event investigation tools such as root cause analysis, identifying one single main cause has become popularised in healthcare. The concept of dispositional causality raises questions regarding the application of linear solutions in complex situations; as there is typically not only root cause to a situation, and systemic factors can easily be overlooked when simplified solutions are offered.

Interactions are generated by dynamic processes and feedback is crucial

Processes in CAS are dynamic, non-linear and arrives from multiple trajectories – lateral, vertical, horizontal or circular – that may all occur simultaneously, slowly or rapidly. Information is acquired and processed via interactions with the system, requiring constant monitoring and feedback. The feedback becomes entrenched in the memory of the CAS, and what has worked in the past are influenced by feedback loops and memory of previous interactions with the system (35, 55). The strength and timeliness of the feedback loops impact the long-term stability of the system. Strong and responsive feedback loops enable better sense-making and responsiveness to cues (112).

Degree of self-organisation

Self-organisation is a structuration process by which a system generates new system-wide patterns over time based on the system's internal dynamics (113). The ability to self-organise enables adaptiveness and subsequent resilience. In an organisation, self-organisation is impacted by structure e.g. the degree of centralisation of decentralisation. If control is too restrictive and centralised, the team may have difficulty collating and interpreting information. This would slow down the ability to adapt to emergence, whereas a degree of decentralisation would permit self-organisation in order to rapidly react to situations (33, 55). That said, informal relationships are self-organised, and these networks can disrupt the formal structures in order to respond to situations. The informal 'organisation' can form another system with its own structures and ways within the formal organisation (55).

CAS are situated in time and space

CAS has a memory, and the past is integrated with the present, providing CAS with memory and capacity to learn. The interaction between history and the current situation leads to continually emerging behaviour that requires continuous sense-making. Should continuous sense-making be hindered for some reason, the capacity to learn may be restricted, leading to decay and threatening the long-term survival of the system (35, 103).

Retrospective coherence

Hindsight provides an opportunity to create a coherent narrative for why things happened; this retrospective coherence is another way of sense-making. Event investigation is a good example of this characteristic where, when analysing an event in retrospect, it is 'easy' to see where things went wrong, and how minor cues that were left unaddressed and as a result

accumulated into failure. Yet, during the situation or incident, it was impossible to see how it was unfolding. Hence, what retrospectively may appear obvious, should not be used to predict future trajectories (103, 106).

2.9.3 Implications of viewing the EC as CAS

Due to its interrelatedness, the EC system is an entangled web that does not lend itself to being analysed in isolated bits and pieces, or as a case of straightforward cause-and-effect analysis. When viewing the EC as a complex human system, ambiguity and a lack of clarity can be accepted as inherent characteristics; not 'issues' that should be overcome (35).

The interrelatedness and interconnectedness hold implications to be considered prior to interacting or implementing change to the system. For example, traditional interventions typically consider strategic planning and improvement projects based on idealistic future states. In CAS it is impossible to set a target and reach it. Anthro-complexity thinking prefers deeply exploring the current situation, from where a preferred direction or vector can be probed (109). This method of rapid feedback loops honours the basic principles of emergence and unanticipated outcomes.

2.10 The adaptive capability of teams

This section builds on Section 2.9, by elaborating on the concept of adaptiveness. The main activity of organisations is the sense-making of equivocal information (3). Sense-making includes not only becoming aware of the equivocality but having the means to communicate and respond to the equivocality. This implies that a well-developed collective sense-making capability depends on the strength of the internal processes as well as the ability to rapidly access multidimensional inputs, make sense of the inputs and adapt to emergence (33).

Defining adaptive capability

Adaptive capability can be interpreted in different ways, and as this study is about organisational capability and human complexity, the concept of adaptive capability in natural sciences are excluded. Table 4 contains key aspects of adaptive capability that is then used to define what the term adaptive capability means in this study.

Table 4: Key aspects of adaptive capability, as described in organisational and team terms

Author	Describes/defines adaptive capability as
Akgun, Keskin and Bryne (114)	an organisation's ability to reconfigure resources and coordinate processes promptly in order to learn faster than the rate of change
Boisot and McKelvey (115)	is about responding intelligently to threats and opportunity in the environment, which implies actively and continuously scanning for cues
Cannon-Bowers, Tannenbaum, Salas and Volpe (116)	the process by which a team uses information gathered to adjust strategies by adjusting behaviours and re-allocating team resources
Heal (117)	is the individual's mental process of effectively reacting to a change. It depends on the following three aspects: behaviour, effective thinking, and organisational culture
Kozlowski, Gully, Nason and Smith (118)	the capability of the team to maintain coordinated interdependence and performance. Adaptability refers to a temporary shift in the team configuration to deal with a non-routine task or event
Neill, McKee and Rose (119)	are influenced by managerial ability, access to information, infrastructure, and institutional environment
Rousse and Zietsma (80)	is the dynamic ability to adjust to volatility, uncertainty, complexity and ambiguity in the environment. It is embedded in the organisation's routines and managerial ability and is concerned with the ability to respond to real-time change across functions
Staber and Sydow (120)	is a dynamic process of continuous learning and reconfiguration. It is rooted in the information-processing ability of the organisation
Weick (121)	is the ability of the organisational system to respond to the environment; and it is grounded in the organisation's sense-making abilities

From Table 4 it is deducted that adaptive capability is a dynamic process that entails continuous learning and adjusting to new knowledge. Adaptive capability is embedded in the organisation's formal and informal structures; and it enables the team to deal with external events e.g. major influx of information, as well as internal events e.g. multidisciplinary interdependence. Adaptive capability includes modifying and reconfiguring responses to deal with emergence, thus it is a dynamic process of continuous, multidimensional learning and communication.

There appear to be four key factors to ensure adaptive capability in teams. These are

Anticipation

The ability to anticipate emergence and using mutual and continuous monitoring of the environment to sense cues and/or detect problems (33, 114, 122).

Information

The ability to access information, maintain information flow, interpret information and use information (33, 116).

Communication

Here, communication refers to a method to make sense, and a way to share the sense made. Communication includes feedback loops, social networks and communication pathways (33, 119, 122).

Adjustment

The ability to be prepared to modify plans and/or reconfigure resources. This implies a willingness to change the mental frame and it implies agency i.e. power to modify and reconfigure plans (33, 114, 116).

The four factors can be interlaced with the process of sense-making (sensing and labelling cues, sharing insights and acting on it) (Section 2.6, page 24) and naturalist decision-making (situation assessment, planning, re-planning and coordinating response) (Section 2.7.2, page 29)(7, 32, 43). Interweaving the key aspects of the adaptive capability of a team with the process of sense-making and naturalist decision-making, insights are provided into how a team in a dynamic environment could make sense and adapt to equivocality. There is no end state to the sense-making in dynamic environments and there might simultaneously be more than one situation that requires sense-making.

A sense-making study done by Christianson are used to demonstrate how these are operationalised in healthcare. The purpose of the study was to examine how teams update sense-making; a process of revising the provisional sense-making to incorporate new cues. They used medical resuscitation simulation to compare the abilities of nineteen interprofessional teams in identifying unexpected equipment failure whilst managing the emergency. The results showed that the ability to update sense-making depended on the

competence of the team to collectively make sense, sense (anticipate) change and adapt to 'emerging' cues. In this study, the teams capable of adapting to change were those that anticipated change and continuously searched for it, communicated their findings as they proceeded while remaining focused on the anomaly.

The less effective teams became distracted by other cues, they 'missed' the discrepancy between the 'evidence' and their explanations e.g. they stopped searching for more information and did not question their current sense-making frame. Further, their communication methods were muddled and they jumped to unvalidated conclusions (54).

2.11 Conclusion

The different sense-making perspectives were considered and fused into one process of sense-making. The potential similarities between CAS, adaptive teams and sense-making was examined and it was found that they overlap in ways that are considered important to this study. This includes that they all acknowledge dynamic as opposed to static conditions; the continuous change in dynamic environments are non-linear and fluctuates. Sometimes the changing circumstances are rapid, other times slow and sometimes overwhelming while other times it trickles in.

Knowledge and understanding are always emerging and when the sense-maker becomes aware of a gap in existing knowledge, they 'bridge-the-gap' by taking action. The 'right' action may not be obvious, and there is a risk of unintended consequence and sense-making may become rapidly outdated. Complex situations may have multiple, possibly contradictory interpretations and in a team situation this may help or hinder sense-making – this depends on factors such as identity, trust, social cohesion and communication methods. It is further contained within the rules and organisational structure and design. The interpretation of the outcomes of the situation is used to reinforce or change the narratives that people tell themselves and others about the organisation and the way that things are done in the organisation, and their role/importance to address situations.

Chapter 3: The Emergency Centre

3.1 Introduction

The EC provides care 24 hours a day, seven days a week, 365 days a year to patients who self-present or arrive via ambulance, without prior appointment. When patients present, their acuity is unknown, so the ability to distinguish between and prioritise those requiring rapid intervention and those stable enough to wait is vital. The care rendered in the EC includes the initial treatment, diagnosis and stabilisation of patients presenting with any complaint, of any age and with varying acuities that require considerably different levels of care (123). Clinically, EC staff must execute all the above, while operationally the EC must be geared to deal with incredible levels of variability. Uncertainty, interruptions, multiple sometimes conflicting priorities and gaps in information flow are inherent work principles of the EC – making it a high-risk environment for error, confusion and crisis (123, 124).

3.2 Operational management

A unique feature of the larger ECs is that physicians are always present, working alongside the nurses in an interconnected and interdependent way, while sharing operational responsibilities. Operationally, the EC needs to respond and adapt to the time-critical demands as they crop up, while continuing with its steady-state operational functions. The operational function refers to resource management e.g. staffing, consumables, pharmaceuticals, equipment and patient flow. Other operational activities include quality improvement projects, budgeting, implementation of policy and standard operating procedures. Externally, the operational function maintains relations and integration with the rest of the hospital.

3.3 Layout and physical structure of the EC

Physical layout determines resource allocation, flow and thus operations; it also provides clues into culture e.g. what is displayed on notice boards or how staff occupy the social spaces (64).

The rest of the hospital is made up of various custom-designed ‘parking lots’ in each ward, which functions and are structured to enable time-bound routines e.g. care, wash and feed times (30, 94). In contrast, the EC forms the highway into the hospital and should be designed to allow maximum flow and diagnostic procedures and to briefly accommodate a broad range of patient populations. It is ideally custom-designed to deal with variability and its

mobile equipment should allow for rapid reconfiguration (124). Should the EC be utilised as a parking lot, blockages are then created that directly impact on its ability to fulfil its core purpose of rendering emergency care.

An example of such a blockage relates to neuropsychiatric patients; in 2013, a strategy was adopted to implement the Mental Health Act of 2002 that advocated the management of such patients in the community. The strategy was intended to alleviate the burden of acute psychiatric facilities (125, 126). Its unintended consequence was that when community care fails, neuropsychiatric patients end up in the EC for extended periods (127). Rendering long-term care does not fit the EC's purposeful design i.e. the provision of emergency care. With limited wash facilities, patient privacy, visitor spaces and staffing resources, basic routine care – e.g. feeding, pressure care and hygiene – become tricky if not dangerous (128).

3.4 Capacity

Capacity is determined by demand and constrained by resources and physical structures (129). Hospitals have a finite overall capacity, and the number of hospital beds occupied (occupancy rate) is influenced by the type and function of the hospital ward e.g. the maternity ward requires enough non-occupied beds to accommodate unscheduled admissions, whereas the surgical ward can utilise most of their beds as the length of stay and admission rate is more predictable (130).

The occupancy rate of the hospital determines the EC capacity i.e. patients cannot be admitted into the hospital if it is full, and then the patients already in the hospital system and due for hospital admission become stuck in the EC whilst more undifferentiated patients continuous to flow into the EC from outside the hospital (57, 131). This is called access block. The EC is the most responsive area in the hospital to increase its capacity as its physical layout allows reconfiguration to optimise the space. As access block and crowding of patients intensifies, the EC copes by expanding its capacity i.e. pushing in more beds and chairs. This creates new operational (and clinical) challenges, especially when undifferentiated and higher-acuity patients are cared for in corridors, in the waiting room or in chairs. Operating at full or over capacity for prolonged periods is unsustainable, and can result in unsafe patient conditions (124, 129, 131).

The ideal occupancy rate of a hospital has not been fully established, but it has been argued that it should not be above 85% (132, 133). Occupancy rates of between 80 – 90% have been linked to cost-effectiveness care, adequate infection control practises and safe patient care,

whilst higher rates are associated with increased mortality, morbidity, more interventions and longer hospital stay (133).

A study conducted in 2017 considered the bed utilisation and occupancy in eight public hospitals in Cape Town. A retrospective record review was done analysing data captured by the Western Cape Government Health Information System. The data revealed that the average bed occupancy of ECs in these hospitals fluctuated between 270 – 370 % (134).

According to the annual 2016/17 Western Cape Health report, overall the average capacity of hospitals in the Province was 86.7% (127). The EC often admits patients into the surgical and medical wards, and these wards operate close to 100%, leaving little manoeuvrability to admit unscheduled EC patients. Considering the high (and unsafe) occupancy rates of the Cape Town ECs it is obvious that the level of crowding is unsafe.

While the EC can be reconfigured physically, the other resources may remain static, thereby resulting in an immediate mismatch between supply and demand. Initially, the EC may cope with the mismatch and higher signal-to-noise ratios, diluted staff and increased workload – but over time it is likely to decompensate, becoming inefficient and increasingly unsafe (135, 136). Other than the danger this holds for patients, the chronic mismatches between resources and capacity lead to staff dissatisfaction and burnout (137).

3.5 Patient flow through the EC

Due to the EC receiving undifferentiated patients with different needs and requirements, and because they can access the EC via different access points, the patient flow through the EC is non-linear, and lengthy waiting times may be encountered between steps (129).

3.5.1 Inflow

When patients present to the EC, they are first triaged according to severity with the use of the standardised and validated South African Triage Scale (SATS). The SATS categorises patients into four colour-coded levels of acuity, and informs prioritisation and recommended time frames for intervention (138).

SATS was developed to address the scarcity of healthcare workers in sub-Saharan Africa and has been validated to be safely used by the ECs lowest category nurse, i.e. the enrolled nursing auxiliary (138). Triage using the SATS is endorsed by Western Cape provincial policy in all ECs (139).

Once triaged, low-acuity patients are streamed to the waiting room, while higher-acuity patients are admitted to the main EC and urgent emergencies are taken to the resuscitation area, which is equipped with critical-care capabilities.

Despite its advantages, triage presents several operational challenges:

- it creates a bottleneck during times of high patient arrivals;
- the triage or lowest category nurse determines patient flow into the main EC;
- when the EC is at or over capacity, higher acuity patients may remain in the waiting room with limited senior oversight; and
- because the triage area is often geographically isolated from the main EC, there may be limited collaboration between the triage nurse and the rest of the EC team – especially when it is busy (57).

3.5.2 Outflow

Patients predominantly flow out of the EC in one of three ways: they are admitted, referred or discharged. (131). As mentioned, high occupancy rates in the rest of the hospital and thus in the admission process present a major operational dilemma to the EC. The patients become stuck in the EC, even though they no longer require the type of care that the EC provides. To new, undifferentiated patients, the ECs ability to render the type of emergency care that they require might be the difference between life and death. This implies that the EC needs the built-in ability to simultaneously render ward-based care as well as emergency care in the same physical space.

A vicious cycle can be created in which the more crowded the EC becomes and the less time per patient physicians have, the more diagnostic tests they request, and the more protracted clinical-decision-making becomes. This subsequently extends patient stays in the EC and further aggravates access block (57, 140).

EC Crowding = ↑demand for care and ↓supply of resources

As crowding intensifies, waiting times for new patients lengthen. Thus some patients abscond or leave without completing their treatment, and may return in a worse state later on (57, 128). Numerous studies have found a correlation between EC length of stay (LOS) and in-patient LOS, increased cost of care, and poor outcomes (57, 124, 141).

Another operational challenge can be presented by the competing demands of the EC team, where the EC physician transfers the duty of care to another speciality, thereby enabling

them to attend to new patients, while the EC nurses remain responsible for the care of all patients in the EC.

3.6 Information flow through the EC

The flow of information through the EC is convoluted because various people must asynchronously access and adjust the available data, thereby producing an environment that is simultaneously information-intensive yet information-poor (135). Administrators, doctors, nurses and other providers share one patient file and the completeness of the clinical information therein depends on how the various providers have negotiated access to the file, as well as their ability to keep up with note-writing and filing (56, 123).

Shift handover is a narrative-based exchange focused on what the speaker considers the most pertinent clinical and operational information. Handover signals the oncoming shift's acquisition of the EC in its current state; it occurs either at the bedside or a central point (56, 123). Operations and in- and out-flow of patients continue throughout handover, with interruptions and flux during the process, potentially resulting in incompleteness, missed transmission of information and ambiguity. A further margin of error is that handovers are typically staggered single-disciplinary – i.e. separate doctor and nurse – events, resulting in limited cross-disciplinary sharing of information (123, 142).

Operational information flows require external inputs and negotiations regarding bed management, replenishing stock, linen, patient meals etc. Some of these decisions are centralised and some data may not be freely available in the EC, which may at times result in fragmented information.

3.7 Demands on sense-making in the EC

Some of the inherent EC demands that may impede sense-making are summarised in Box 1. Note that these demands all occur in a fixed space, with fixed staffing and resources.

Box1: Demands that may impede sense-making

Incessant flux/noise Patients undifferentiated Patients often not in expected spaces e.g. very urgent patients in the corridor, waiting area or in a chair A high number of false cues, alarms and noises Adaptable environment e.g. equipment and patients move around
High variability Variable number of patient arrivals Variable levels of skills/team configurations Workload varies Shift start times vary Temporary staffing
Information is incomplete, yet overwhelming Incomplete patient information at presentation Unequal access to information, including internal and external stakeholders Fragmented information, records are kept mixed in written and electronic formats
Organisational factors Multidisciplinary teams with different structures, procedures and rules, chains of command Centralised operational decision-making Bureaucratical structure with hierarchies

3.8 Doctor and Nurse collaboration in the EC

The doctors and nurses in the EC work together in the same space, caring for the same patients, vying for the same resources – yet adhering to different chains of command that feature contrasting policies, procedures, rules and behaviour (30). Doctors and nurses have disparate task complexities and workload dimensions, remaining simultaneously independent and interdependent. Knowledge is created individually and collectively, and team members are simultaneously part of different teams, no single member is privy to all the knowledge available within the EC. Further, the team members may be involved in sense-making activities in more than one team at a time.

The team structure in ECs is dynamic, with team members constantly moving in and out of newly formed teams and temporarily interacting to complete an episodic task e.g. a patient intervention or checking the stock. Once a task is complete, the team disperses, and members join other teams or perform individual tasks.

The degree of interprofessional cohesion and collaboration are influenced by structure, culture and enduring mental frameworks. Collaboration is intricate and not a given; and team members can choose to share, compete or withhold information and resources from others. But it is not only about negotiating the teams, tasks and collaboration in the EC. The EC is embedded in a multilevel hospital system with professional, team and organisational accountabilities. This extends to how doctors and nurses are educated and governed. As mentioned earlier, doctors are socialised to be autonomous practitioners, to take charge and lead. They are expected to be less socially competent and communal than nurses (66). The socialisation extends throughout their education, the learning methods used, the societies that they belong to and how they are treated when entering the hospital (102). Thus, a doctor might naturally assume the identity of autonomous decision-maker, regardless of whether it is the type of situation that they have knowledge about.

In turn, nurses may automatically assume a subservient role, and use indirect methods to communicate (67, 68). The combination of stereotypical doctor/nurse behaviours may adversely impact collaborative practise. Doctors and nurses tap into pre-existing structural elements to inform their action, these structures could be formal or informal, and it is possible that it is especially the structure of the informal relationships that enhances or constrains access to resources e.g. relevant information (76).

A concept often mentioned in the literature regarding interprofessional collaboration is reciprocity. Reciprocity occurs when collaboration across the boundaries is patterned on effective communication, social capital and respect for professional identity (15, 143). Reciprocal networks lead to

- Improved sense-making (9, 11, 144);
- Sharing information across multiple perspectives, which is helpful especially for operational tasks that are non-routine and ambiguous (145);
- A lower incidence of patient error, work-related injury and absenteeism (146);
- People in reciprocal networks are more likely to admit mistakes, ask for help and provide feedback (71, 147);
- Shapes positive attitudes and offer support, which implies increased social interaction, collective idea generation and collaboration (147); and
- May improve the quality and reduce the cost of care (148).

However, establishing reciprocal relationships between doctors and nurses might be tricky because the importance of reciprocity is not made explicit in the formal structures e.g. high

vertical hierarchies, separate chains of command, centralised decision-making and other autocratic systems that do not encourage reciprocal and horizontal teamwork (67).

Failures to collaborate and function as an interprofessional team are often described as the cause of medical error (149). This might be especially true in the ECs unique practice environment. The environment is volatile and uncertain, and the team battles with fuzzy overlapping boundaries, high cognitive load due to decision-making density, frequent interruptions and constant flux. Fatigue and stress lead to stronger attachments to conditioned mental frames, with stressed professionals appearing more likely to withdraw into their professional silos. This creates a vicious cycle, that when they need to pull together as a team, they are withdrawing into silos (94, 101, 102, 123, 150).

The failures in interprofessional teamwork have not been explored or described in the South African EC setting, and it is highly likely that breakdowns in teamwork are causal to medical and operational error in these ECs. The setting differs from countries in which emergency care is more established. In South Africa, emergency medicine was only recently recognised as a medical speciality and emergency nursing is not recognised as a nursing speciality (Section 3.12, page 59). Further, South African ECs needs to be able to deal with high levels of violence, trauma as well as non-communicable disease, making it more challenging to operate in the South African setting (127).

3.9 Professional governance

National regulatory frameworks set standards for each discipline's conduct, maintain registers and guide professional development. Medical practitioners are required to be registered with the Health Professionals Council of South Africa (HPCSA), while nurses are required to register with the South African Nursing Council (SANC) (151, 152). There is limited collaboration between the two regulatory bodies. Within the hospital, nurses and doctors follow different chains of command, in-service training programmes and rules. This enforces various visible and invisible rules and ideologies.

3.10 Resource management

The EC nurse manager controls the inventory, including consumables, pharmaceuticals, linen and equipment. These resources are managed by enforcing stringent processes e.g. the linen and stock rooms are locked and the keys kept by one person (142). Controlled medical substances are always locked away, and the keys kept by a professional nurse; administering a controlled drug requires a long-winded regulatory process (153, 154).

3.10.1 Consumables and equipment

Consumable stock levels are predetermined, and any adjustment to these levels requires permission from top nursing and pharmacy management prior to release. This hampers responsiveness to fluctuating needs or meeting demands from atypical EC patients e.g. boarders. Daily equipment checks are allocated to the nurses, and faulty equipment is reported via the chain of nursing command.

3.10.2 Operational budget

Doctor and nurse EC managers are responsible for the staffing budgets of their own disciplines. In terms of budget, the EC nurse manager oversees the operational or running budget and contributes motivations and quotations for the annual capital budget, with the final hospital budget being approved and allocated provincially (94).

3.10.3 Staffing

The staffing levels and models for doctors and nurses in the EC are set and managed separately (155). Both are supposed to be based on workload indicators, such as headcount, acuity and non-direct patient care. Due to the unique practice environment and the inherent unpredictability of the EC, the level of experience and skill of staff has an impact on the ability to interpret risks; and for safety reasons, it is recommended that ECs use a higher percentage of higher category nurses that are skilled and possess critical reasoning abilities (156).

The use of temporary staff has become normal in hospitals; they are booked according to short-term daily planning. Electronic platforms are used to ensure standardisation and equity of agency staff. Using the platform, managers request staff, agencies nominate individuals and bids are evaluated by top-management against cost and agency performance history.

Although the system ensures fairness in allocating agency staff, the procured staff may not be familiar with the EC. The workload of permanent staff members increases when temporary staff must undergo orientation and the literature reveals that temporary staff are less vested in ensuring the EC's smooth operations than their permanent colleagues (94, 157).

3.11 Boundaries of the EC

The EC is an open complex system with permeable boundaries and is embedded in other systems e.g. the rest of the hospital. The history of the hospital, the EC and those working within it partially determine its current state.

The boundaries of collaboration and reciprocity are not visible, and doctors and nurses are constantly crossing professional boundaries to interact. People create their own boundaries e.g. selectively sharing information, socialising, or using language and jargon to demarcate subgroups. Attempts to study doctors and nurses in the EC have often disregarded this interdependence and shared presence (158).

3.12 Emergency care as speciality field in South Africa

Emergency medicine (EM) is a broad generalist discipline, which has been recognised as a medical speciality in South Africa since 2003. ECs without EM physicians are staffed by medical officers and junior doctors often with limited oversight and support (159). When the first EM physicians were appointed, they inherited some of the old regimes, systems, operations and even status of the time before 2003. This harbours several implications e.g. EM physicians may have a lesser status than more established specialities, such as surgery. Also, the physical design of hospitals (especially those designed prior to 2003) would not have considered development and the needs of EM.

Regarding the status and negotiation power of EC nurses: emergency nursing is not yet recognised as a professional nursing speciality. With no specified scope of practice and limited post-graduate courses, professional nurses may be put off from working in the EC – preferring to specialise in recognised fields that offer better salary prospects and opportunities for career progression (160). Therefore, it is not surprising that a recent workforce analysis by the Western Cape's Department of Health demonstrates shortages in nursing staff with EC competencies and skills (127).

3.13 Situating the EC in the health system

The cumulative impact of past events and decisions informs the EC's current situation, including the ways things are done today. This section provides a broader view of external factors related to the EC e.g. health systems and societal factors that may impact on its culture and operations.

3.13.1 Background into the South African health system

South Africa's two healthcare delivery systems, which are divided along socio-economic lines, run in parallel. The private healthcare system serves around 20% of the population, who are typically insured and makeup roughly 46% of total healthcare expenditure in South Africa

(161, 162). The public healthcare system, on the other hand, largely depends on tax revenues to serve the other 80% of the population (161, 163).

In 1994, the first democratic government inherited a highly fragmented public healthcare system that was focused on hospital-based care (163-165). Tertiary services were confined to well-developed government-financed academic hospitals, at the expense of primary care and community facilities in rural and poor areas (166). To improve access to care, a broad primary healthcare approach was adopted – the implementation of which was going to require considerable sums of money from a finite budget (161, 163, 167). This problem was partially addressed through the redistribution of funds from hospitals and the levelling of expenditure across provinces e.g. reallocating some of the Western Cape's budgetary resources to the Eastern Cape (161, 163, 165, 166).

The redistribution of health budgets has contributed to the current neglect of public-sector hospitals, which now struggle with limited resources to upgrade and maintain their existing facilities (126, 163). In the Western Cape, the emergence of emergency medicine coincided with the 'double' budget cut from curative care and the reduction of the provincial budget; this no doubt impacted on the resource allocation available for EC development and improvements.

The private sector has grown rapidly over the past two decades and continues to do so, thereby widening the disparity between private and state healthcare (164, 168). Due to cost, private care is exclusive; the cost of contributions to medical insurance schemes has grown at a rate almost double the consumer price index (162, 166). The sector attracts a disproportionate number of healthcare workers, with roughly 70% of the country's medical practitioners practising in the private sector (168). Yet, as the population able to pay them has declined steadily over the past decade, there is a risk of oversupply due to increasing numbers of healthcare providers and a declining number of insured patients (163, 169).

3.13.2 Structure of the public health sector

Healthcare is provided in a tiered structure, with patients entering at the bottom and being referred upwards; each tier provides more intensive specialist care than the level below (Box 2). The National Department of Health provides the overall strategy, sets legislation and monitors implementation (94).

Box 2: Health services from the bottom up (161, 163)

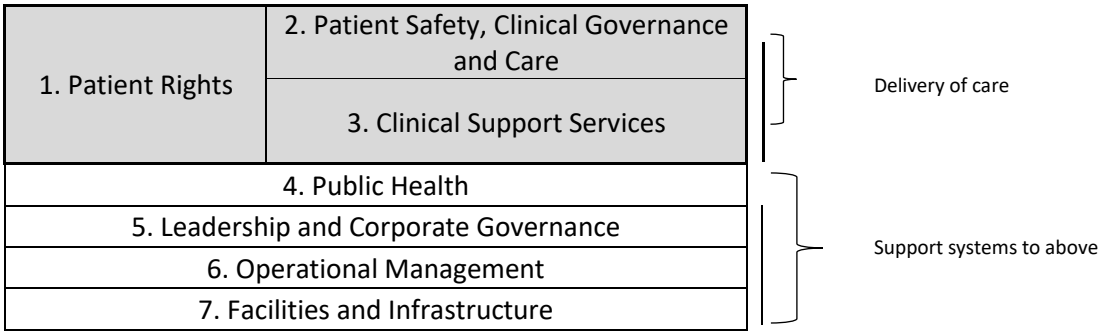
The areas that this study is focused on are shaded in grey.

Local Department of Health, Cape Town Metropole
City of Cape Town Primary Health Facilities
Nurse-led by Clinical Nurse Practitioners Clinic hours 07:00 - 16:00 Closed after hours and weekends Ambulatory, preventative, promotional and curative care Estimated 104 clinics in Cape Town
Provincial Department of Health, Western Cape
Community Health Centres (CHCs) or day hospitals
Ten are open 24 hours a day, with the rest having clinic hours No overnight/ward facilities Able to render basic emergency care Refer to district hospitals Forty-seven CHCs in Cape Town
District hospitals
Each district hospital serves three to five CHCs Varying general specialist services; adult and child care; in and outpatient care Four of the district hospitals have ECs staffed by Emergency Physicians Refer to regional and tertiary hospitals Seven district hospitals in Cape Town
Regional hospitals
Full package specialist services ECs staffed by Emergency Physicians Refer to tertiary hospitals One in Cape Town: New Somerset Hospital
Tertiary Hospitals
Highly specialised services No dedicated EC Dedicated Trauma and Medical Emergency Three in Cape Town: Groote Schuur, Tygerberg and Red Cross Children's Hospital

3.13.3 Governance of the public health sector

Hospitals and ECs are expected to meet a certain level of quality. The National Core Standards (Box 3) are used to benchmark the expected quality of care within the policy context (170). The core standards have been laid out with seven overlapping domains, each representing an aspect of risk. The layout is deliberate; the first three domains are where care is rendered with the other four intended as support systems (170).

Box 3: Domains of the National Core Standards



3.13.4 Burden of disease

South Africa is a middle-income country, with health indicators and outcomes that are worse than some low-income countries and health expenditure that exceeds most other middle-income countries (161, 163, 171). This is in part due to the quadruple burden of disease that South Africa faces – namely the illnesses of poverty, non-communicable diseases, HIV/AIDS and injury (163). This burden of disease is further aggravated by a combination of various acute and chronic diseases that span all age groups (165).

South African ECs are strained by the abovementioned burden of disease, by non-compliant primary healthcare patients, neuropsychiatric patients and medical emergencies related to HIV complications. They must *also* manage the consequences of unemployment, poverty and violence (127). In the Western Cape, three out of four patient presentations at ECs are estimated to be due to the complications of non-communicable chronic conditions (126).

Traumatic injuries have a very high local burden and include penetrating injuries, gun-related violence, sexual assault, road accident and unintentional injuries (e.g. burns far exceed global averages) (155, 172). Violence is the second most common cause of death in the Western Cape; a data analysis from three high-burden ECs in Cape Town found that 38.5% of all presentations during a one-week period were due to violence and these occurred mostly on weekends and after hours (173-175).

The workload in Cape Town ECs is higher after hours and over weekends, coinciding with the times that the rest of the hospital is on reduced operations (176, 177). This places a further burden on the EC when compared to other wards, as it must remain fully resourced and staffed at all times. It, therefore, becomes the default area of the hospital in terms of fulfilling functions for other services e.g. the pharmacy by dispensing discharge medication after hours or responding to emergency calls from the wards (178).

3.13.5 Social determinants of health

Social determinants are factors outside healthcare that determine health status e.g. community, culture, human rights and equality (179). An in-depth discussion of social determinants falls outside the scope of this study. It is only mentioned here because of the strong relationship between health and socio-economic class, with the society in which the EC is located influencing its patient mix and variability (167). For example, the consequences of unemployment that perpetuate violence and the diseases of poverty end up being treated in the EC (167).

There is also a correlation between health utilisation and socio-economic class, with significantly higher numbers of poor people not seeking healthcare when they are ill or injured; they may, however, present at the EC as an emergency if their condition deteriorates acutely (163). Racial groups in South Africa reveal different top causes of death – black Africans and Coloureds suffer from the diseases of poverty, HIV and Tuberculosis; while white Africans and Indians are more likely to suffer from non-communicable disease (180).

3.13.6 Constraints to public healthcare service delivery

Stagnation of funding

In real per capita terms since 2008, funding for public sector healthcare has stagnated (126, 165). This, in combination with the redistribution of funding, has negatively impacted hospitals in the Western Cape. Operational budgets often show little relation to the operational activities they must fund, which is has been worsened by financial decision-making power being centralised at provincial level. Hospital financial managers are therefore given limited power to impact and manage the finances of their facilities (94).

Poor leadership and management in healthcare

Health-system efficacy and performance have become dismal; between 2009 and 2013, ZAR 24 billion (6.3% of combined provincial expenditure) was audited as irregular spending, with a further ZAR 8 billion being unauthorised and ZAR 1.3 billion wasteful (181).

Failure is exacerbated by poor managerial capacity and accountability, and clumsy bureaucracy (94, 182, 183). Dysfunctional structures and rigid hierarchies throughout the public healthcare system remain a limiting factor to its responsiveness (183). For example, district services delivery is locally executed, yet decision-making (e.g. appointing senior hospital positions and operational budgetary management) is centralised at provincial level

(94, 163). Compliance with provincial bureaucracies weighs more than hospital needs, which creates a significant gap between rules and situational realities (182).

The bureaucratic structure of hospitals

Bureaucracies hinder the adaptive capability of hospitals; it has been shown, in general, that fragmented processes in strong silos create overlaps in some areas, and shortages in others (30, 94). Hospitals should have integrated management systems to reduce muddled accountabilities, gaps between silos and dysfunctional operations (94).

Human resources

Human resources remain an important component of healthcare services, with brain drain internally from public health into the private health sector and externally, via emigration, impacting on public healthcare delivery. Brain drain, in combination with budgetary constraints, has resulted in unfilled positions and staff shortages (127, 155).

The risk of interpersonal conflict increases in tandem with chronic staff shortages, with public-sector health workers, frequently being described as demoralised and non-compassionate (94, 167, 184).

Poor supply-chain management

Regular issues with supply chains continue to hamper service delivery e.g. when the National Department of Health is late in awarding tenders and this results in shortages of medication across all platforms (126). Obscure compliance rules, replication and limited integration between provincial and national supply chains also serve to create delays (127).

3.14 Conclusion

The unique operating environment of the EC was discussed – patients that arrive are undifferentiated and they can present at any time of the day, the patient flow through the EC is non-linear. This increases the variability of the EC, thus requiring a flexible and adaptive unit. Yet, the organisational design remains similar to the more predictable ward environments of the hospital. This creates a barrier to EC operations. Doctor/nurse collaborations are impeded by organisational structures, history and professional governance bodies. Especially in the EC, this again hampers the ability to collective make sense and adapt to the environment.

Finally, a background into the EC was provided; this included situating the EC within the South African public health system.

Chapter 4: Methodology

4.1 Introduction

How does the EC team make sense of the operational changes and challenges, within their immediate environment?

This exploratory non-hypothesis study explores sense-making in large, Cape Town-based public sector ECs. It has been designed to probe daily operations in the EC, by studying the phenomenon of collective sense-making. Of special interest are the team dynamics at play, the communication taking place and the interplay between formal and informal structures. Sense-making is seen as a precursor to adaptive capability, i.e. the ability of the interprofessional EC team to respond to emergence whilst continuing operations.

The study is subdivided into two studies, both contributing to a thick description of the EC. The first study situates the EC by providing a thick description of its context, daily operations, and formal/informal processes. This aligns with the general sense-making approach of pragmatically describing useful models within the natural setting, rather than from a removed location (44, 51). The methods followed for study one is discussed in Section 4.4 (page 73).

The second study (Section 4.5, page 75) utilises the SenseMaker® tool to capture narratives and explore the process of sense-making in the EC. Participants describe a narrative they perceive as note-worthy and use the tool to self-interpret their narratives into a custom-designed framework. A secondary purpose of the study is to reflect on the relevance of SenseMaker® as a research tool in this context (Section 7.8, page 169). An analysis of the reflexive journal forms the bridge into the findings (Section 4.11, page 87). Box 5 shows the timeline of the project.

Table 5: Timeline of project

2016	
January	Register: year one, preparation and design of the study
2017	
February	Emergency Medicine Divisional Research Committee (EMDRC) summary approval
June	EMDRC proposal approval
August	Health Sciences Human Research Ethics (HREC) Approval
August	National Research Database (NRD) approval for a descriptive study
August to December	Data collection descriptive study
2018	
May	SenseMaker® study goes live
June	Follow up visit the descriptive study NRD approval for SenseMaker® study in EC4
July	NRD approval for SenseMaker® study in EC5
August	UCT DSA100 approval to access emergency medicine registrars during training sessions
October	Follow up visit for descriptive study
November	SenseMaker® study close
December	Data analysis SenseMaker® material
2019	
January	Data analysis SenseMaker® material
February	Integrate study parts and start writing up

4.2 Approach and paradigm

This study uses a social constructionist worldview to explore the process of collective sense-making in the EC (185, 186). The question being asked is not whether individuals make sense for themselves, but instead explores mechanisms for sharing insights as situations unfold and how teams set about sharing knowledge and communicating. The underlying ontological and epistemological principles of sense-making have already been discussed in the literature review and won't be handled in detail again (Section 2.3 and Section 2.4, page 17).

The sense-making views on knowledge and reality influenced the methodology, reasoning, and conclusions selected, and aligning the research paradigm, reasoning and methods ensure design coherence and validity (187).

Studies based on social constructionist worldviews seek predominantly to understand the context-specific meaning applied to the natural spatial-temporal environments of participants (186, 188). Knowledge is constructed socially and subjectively and is then shared via language, symbols, narratives and social negotiation (186).

The boundaries to knowledge generation are predominantly imposed by mental frameworks, which in turn are influenced by factors such as roles, experiences and expectations. So, even

in a homogenous group, multiple perspectives of the same situation will be created. By capturing numerous memorable stories from the EC and by finding patterns of interpretation between these, we can explore and expose the processes of sense-making, of communication and of their underlying thought models (85, 186, 189).

The concept of 'construction' highlights another theme of sense-making, which is that there are no static entities: organisation, culture and knowledge are all dynamic, constantly modified concepts in the organisation. This is why a logico-deductive attempt to create a rational explanation of sense-making in the EC would not be a feasible option for this type of study (188).

Because this study explores multiple perspectives with a focus on how it impacts the interprofessional team dynamics, it requires an open-ended exploratory approach and a design that is able to hold – and explore – unexpected and novel findings. Further, using a narrative inquiry may increase the relevance of the organisational knowledge produced as it would provide insights into how the EC team are experiencing their workplace (34).

The reality in the EC is socially constructed through intersubjective and interprofessional interactions; making it inseparable from the EC context, its people and the researcher (188). This requires a specific research mindset, which begins with acknowledging the researcher's influence during description and interpretation (186, 188). Therefore, the researcher needs to have checks in place to reduce bias and assumptions, which will be discussed in more detail under trustworthiness (Section 4.10, page 85).

4.2.1 Abductive reasoning

Reasoning has to do with the relationship between data and theory, with abductive reasoning referring to a creative conjecture that's aimed at finding novel insights – with the most likely interpretation being based on emerging evidence. Abduction enables moving between inductive, deductive and abductive reasoning, by moving towards the most plausible explanations and tapping into semiotic knowledge (189, 190). This fits well with the non-hypothesis exploratory design that includes a variety of research strategies, e.g. interview, observation and storytelling. Hypothesis-led studies leave little room for emergence. If a study is preoccupied with proving or disproving a framework, the reasoning behind it is likely to be forced into a pre-existing concept mould (189).

By using abduction, the contextual fit between data and theory can be explored, thereby allowing new ideas and concepts to emerge (189). Rather than establishing causal connections, reliable predictions or idealistic future states, this study searches for the

conditional and relational knowledge of the current reality (190). These under-formulated, perhaps even unnoticed, knowledge gaps are where abductive reasoning has the most power and applications can bring about surprising insights (190). At most, abduction delivers plausibility based on coherent data and patterns. It offers less certainty than purely deductive or inductive reasoning, making it largely inappropriate for proving or disproving a hypothesis (189). To counter this weakness, data will be triangulated between the thick descriptive study, the SenseMaker® tool with participant self-interpretation, and a separate narrative analysis.

The success of abductive reasoning is dependent on the researcher's ability to cope with ambiguity and unanticipated findings during the research process. Additionally, the researcher needs to distance themselves sufficiently so as to acknowledge and manage their biases/world-views, a process which can be strengthened by keeping a reflexive journal and an audit trail that allows others to see how conclusions were reached (60, 189, 191).

The strength of using abduction, in conjunction with SenseMaker®, is that both allow toggling between observation and explanation; they dig deeper into complex realities, theories and empirical explanations (60). This makes abductive SenseMaker® studies theoretically sensitive, thereby allowing novel insights to enrich the findings without dictating what the results will yield (189). Again, by accepting incomplete and obscure knowledge while exploring sense-making with an open mind, new insights, theories and questions can emerge (190, 192). This approach works exceptionally well in conditions of fundamental uncertainty and the unknown unknowns of complex human systems (190).

4.3 Strategy

This study was divided into two main sections and used a phased approach, with different methods at different times, to best capture rich information and varied perspectives that suit the unit of analysis, i.e. the process of collective sense-making. A key design strategy involved producing a thick study that allows for multiple voices, perspectives and realities.

The thick descriptive study probes into the formal structures and organisational set-up of the EC, describing its natural context (19). Informal and semi-structured interviews were carried out with both doctors and nurses. The repetitive methodological process includes observation, interviews, recurrent visits and dividing time between both disciplines (188, 189).

Then, the SenseMaker® tool was used to obtain meaningful stories from people in the EC. These stories convey hidden information about what those working in the EC believe to be

true about their context. The combination of the SenseMaker® study with the descriptive study creates a detailed, thick contextual study of the ECs.

4.3.1 Appropriateness of strategy

A flexible research strategy that applies varied data collection techniques is likely to provide rich data. The design strategy should be based on the fundamental assumptions of social constructionism, where reality is constructed socially and exists in the minds of the people (85, 115, 187).

Those employed in the EC are not passive receivers of isolated problems, so they need mechanisms to help them detect, communicate and react to situations in their environment (11). The interplay between situations and people are important in solving contextual relationships, collaborations and dynamics. Not having a hypothesis means the EC could be explored from numerous angles, with no pre-set framework or isolated problem to solve.

Additionally, in natural settings, there are meaningful consequences for every act or missed anomaly. This study allows for such consequences, whereas a controlled study setting carries no consequence (48, 51). Positivist paradigms tend to isolate study objects from their social context and review them in static controlled environments, thereby testing a hypothesis with generalisable results.

4.3.2 Use of narrative as strategy

This study used narrative to explore sense-making, and not as the phenomenon studied (193). Narratives carry meaning that is not neutral, so they can be used to express divergent interests, maintain the organisational culture and legitimise power structures (115).

In the EC, some voices carry more weight and power than others, and as such, they are heard more often (34). This study has been designed to hear all the doctor and nurse voices equally, regardless of the storyteller's position. So: discussing the same findings from a critico-ideological stance would have yielded very different discussion points. As an example, in a critico-ideological perspective, the power- and status- differential would have been a focal point, whereas in this study even though we acknowledge the possibility of such differential, the focus remains on sense-making.

Narrative inquiry is often used together with qualitative methods to study organisations, where employees are the legitimate storytellers and their stories constitute valid empirical information for research (34). Narrative inquiry is predominantly used in five main areas of organisational research: sense-making, communication, ideology, learning, and

organisational identity (34). Even though this study is focused on the first area, its findings may provide insight into the other areas as well.

By capturing the stories and thus the social processes in the EC, the various story themes and multiple truths that emerge can be used to improve sense-making in the EC (34, 82, 194).

Sense-making methods do not seek timeless, static statements. The continuity of its stories is embedded in the EC, free from any chronological or linear sequence, e.g. some stories could have been inherited, yet are still accepted as truth without questioning their current validity (34, 82, 193). The SenseMaker® tool captures these and other stories by using an elicitation question. The elicitation question has been carefully crafted to allow the freedom to choose any story, yet situates that story within a specific and familiar mental framework (82).

4.3.3 Participants

Both studies were conducted in regional and district hospitals in the Cape Town Metropolitan area that employs emergency physicians, as hospitals without emergency physicians' function completely differently.

For the descriptive study, I described three of these ECs. Using non-random purposive sampling based on location I used Victoria Hospital (Wynberg), Karl Bremer Hospital (Bellville West), and Mitchell's Plain Hospital (Lentegeur). Although all three employ emergency physicians, they function very differently, e.g. emergency physicians at Mitchells Plain cover Heideveld hospital as well, with Karl Bremer being closely situated to the tertiary hospital to which it refers patients.

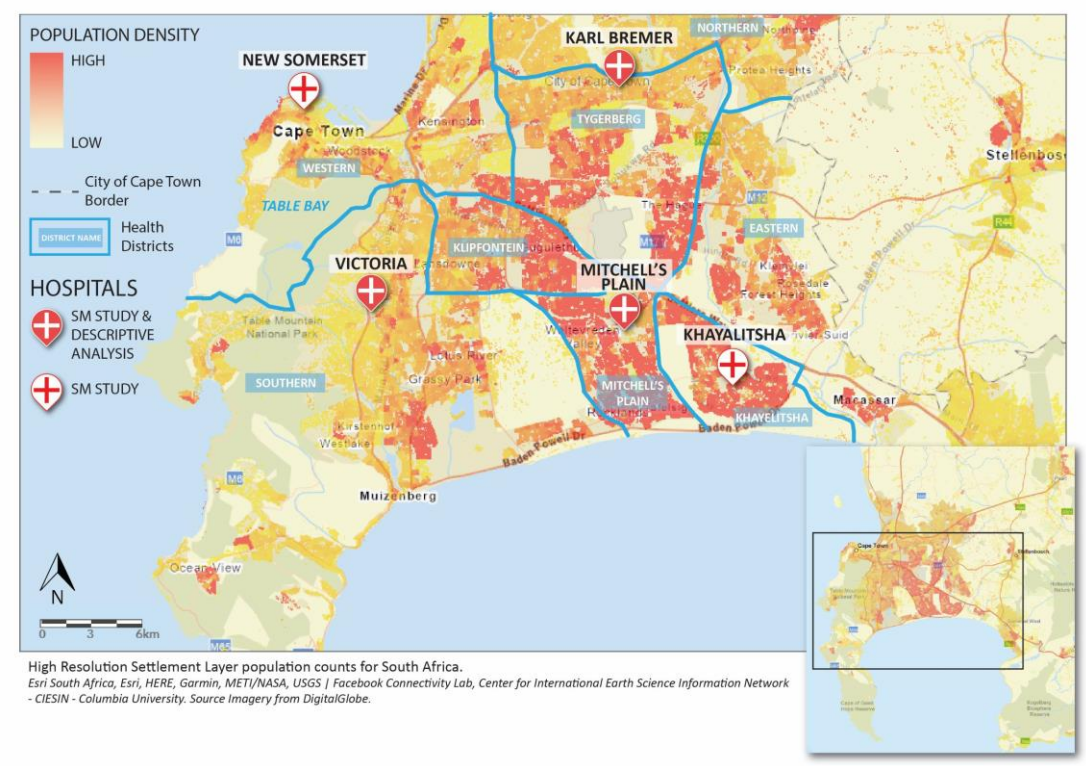
Despite the different ways of operating, the three hospitals are required to meet the standard benchmarks for their quality of care within the National Department of Health's policy context and the National Core Standards (Box 3, page 62).

For the SenseMaker® study, all categories of doctors and nurses working at the five large public ECs located in the Cape Town metropolitan area were invited to participate. This included: Victoria Hospital (Wynberg), Mitchell's Plain Hospital (Lentegeur), Karl Bremer Hospital (Bellville West), Khayelitsha Hospital (Khayelitsha) and New Somerset Hospital (Green Point).

Doctors and nurses constitute the core of EC operations, and they are typically studied as separate disciplines. However, in this study, they were studied as one complex human system that is interdependent and interconnected. Stakeholders that function in a support capacity to the core team, e.g. administrators, porters and security staff, are excluded as their

operational responsibilities differ from those of the clinical team. Other exclusions include patients and clinical decision-making (34).

Figure 6: Map locating the ECs that participated



4.3.4 The researcher

Through the social constructionist lens, it is impossible to disengage and detach the researcher from what is being researched. The researcher remains subjectively and socially positioned throughout, occupying a stance that influences his or her vision and mental framework (34, 60).

The researcher actively constructs the research boundaries throughout, which results in strengths and weaknesses. A strength is that he or she can provide historically situated insights on the topic, while a weakness is the risk of bias and self-stereotyping.

The risks were managed by continuous self-checks, critical self-appraisal of intentions in a reflexive journal (Section 4.11, page 87) and keeping an audit trail throughout the study (189).

My emergency care experience spans across clinical care, management, research and education: this experience is reflected in this study. I further contribute perspectives from working as paramedic delivering patients to the EC, as well as working as Critical Care Nurse receiving critically ill patients from the EC. Acting as after-hour manager in charge of the

whole hospital, I am able to add yet another perspective on the needs of the EC versus the rest of the hospital.

Using SenseMaker® largely reduces the inherent risks, because the participant/storyteller self-interprets and deciphers the meaning of their own stories without external influence. After participant self-interpretation all stories were combined into a common database, thereby creating a multi-ontology that excludes the researcher stance (17, 20, 47).

4.4 Study One: Descriptive study

This naturalistic study describes the conditions and tangible processes in the EC (51). Three large ECs in the Cape Town metropolitan area have been described in terms of resources, structure, physical outlay and operations. Study one took place between August and December 2017, with follow up visits between May and November 2018.

4.4.1 Inclusion and exclusion criteria

4.4.1.1 Inclusion criteria

Three ECs at regional and district hospitals in the Cape Town metropolitan area that employ emergency medicine specialist physicians were described.

4.4.1.2 Exclusion criteria

- Facilities that have no emergency physician: this is because the structure, role, responsibilities and expectations of the EC are different in facilities with no emergency physician;
- Rural regional hospitals, as they function differently to those in the city;
- Tertiary hospitals, as the EC fulfils a different role in these hospitals;
- Day hospitals, as they cannot admit patients beyond the EC; and
- Private hospitals because of divergent operations and resources.

Using non-random purposive sampling, Victoria Hospital (Wynberg), Karl Bremer Hospital (Bellville West) and Mitchells Plain Hospital (Lentegeur) were selected. These ECs have dissimilar external factors impacting on their operations, e.g. Mitchells Plain EC splits staff to oversee Heideveld EC, while Karl Bremer is closely situated to its tertiary referral hospital. Hospital architecture and age vary, with Victoria Hospital being more than a century old and having undergone few structural upgrades. Mitchells Plain Hospital is one of the most

recently built district hospitals (it is not yet a decade old), while Karl Bremer Hospital's EC was recently revamped, although the overall hospital is older. These three hospitals are situated in different socio-economic and geographical locations, which influence patient mix and subsequent operational requirements.

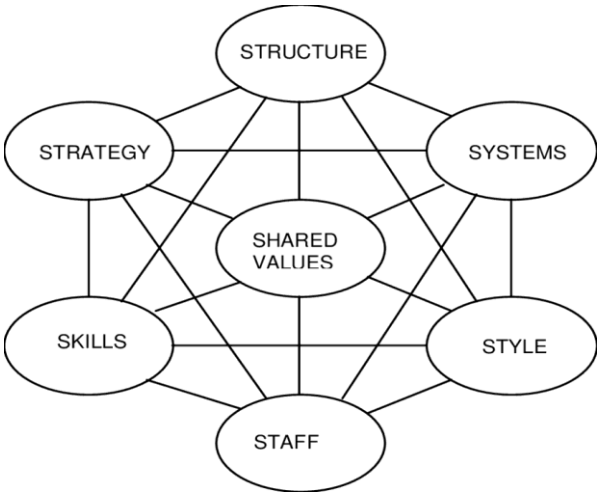
4.4.2 Methods

4.4.2.1 Observation and description

For this part of the study, a checklist was developed that was guided by the 7S framework (Figure 7) to systematically observe and describe the layout, organisational structure, management style, policy and procedure systems across the three hospitals (96). The interplay between the aspects of the 7S framework was briefly discussed in Section 2.8.2 (page 36). Observation with informal and unstructured interviews were carried out in the form of naïve questioning, which was intended to gauge individual perceptions and routines. Semi-structured interviews were held with doctor and nurse managers.

This part of the study describes the daily operations of the EC. Findings are considered more trustworthy if descriptions are thick – meaning they should paint a clear and detailed picture of the EC, presenting detail, context, culture and dimensions of social behaviour (19). Starting with the descriptive study is coherent with naturalistic sense-making design because it typically begins by describing conditions and people in the study setting (51, 59). Note, due to observation being time-consuming and biased by the observer's mental framework and preferences, observation only forms a minor part of the study (85).

Figure 7: The 7S framework described by Waterman and Peters (96)



4.4.2.2 Data collection: Phase 1

Data were collected in each EC by describing physical layout, amenities and formal structures. This collection phase included observation of daily routines, e.g. handover, who speaks to whom, etc. It was systematically structured using the designed guide. Interviews were held with staff in each EC to discuss daily management, patient tracking, staffing and the governance systems in place. Unstructured observation included observing communication with colleagues, patients and others. Policy folders, procedure folders, checklists, allocation books and EC registers were reviewed. Photos of vision, mission statements, visible rules and symbols were taken with permission from the managers. No photos were taken of staff or patients.

4.5 Study Two: SenseMaker® study

SenseMaker® is a suite of software tools developed by Cognitive Edge (27). It is rooted in anthro-complexity thinking and is a narrative method that employs visualisation extensively to uncover patterns and relationships in the data. SenseMaker® is commonly used as a tool for inquiry and to diagnose process conditions in complex human systems; SenseMaker® surveys are purposefully built to explore underlying theories identified prior to survey design. In this study, a combination of Weick's process of collective sense-making and Klein's data/frame sense-making model was used to inform the design (7, 43). Weick, Sutcliffe and Obstfeld set out the steps for the process of sense-making (Section 2.5, page 18). These questions were used to design the underlying SenseMaker® framework. Each step in the process of sense-making is represented with at least one question in the SenseMaker® survey. Neither the process of sense-making as explained by Weick, Sutcliffe and Obstfeld or sense-making as explained by Dervin clarify how the sense-maker applies their mental frameworks, and so Klein's data/frame model of sense-making (Section 2.5.4, page 21) was used to inform questions on mental frame.

One of the key differences between SenseMaker® and other narrative methods is the researcher's involvement. Normally, in narrative research, the researcher is intimately involved in assigning meaning and coding narrative data where, regardless of how objective and systematic the interpretation, it is inevitable that bias will be introduced. SenseMaker® creates a distance between researcher and interpretation, in which participants become social theorists whose self-interpretation of their narratives is displayed as quantitative data prior to any researcher manipulation thereof (23). This allows for a mixed method that

combines statistical interrogation and visualisation of quantitative data, with the persuasive power of narrative.

In short, the survey starts with an elicitation question. This prompts participants to tell a short descriptive narrative, after which they are led through a series of specialised questions that allow them to self-interpret their story within the predesigned framework. The self-analysis questions are called signifiers, and these add various layers of interpretation – as well as emotional tone – to their narrative. Signifiers are designed to be simple and easily understood, yet they should be sufficiently sophisticated to capture underlying theoretical constructs and the dispositional tendencies of a system.

Narrative and self-codified data are captured as meta-data in a common database, which can be visualised statistically (9). Another novelty of this method is that during analysis, the original stories can be recovered immediately to better understand patterns of interest, e.g. when a cluster of stories are read to help understand a data point. In SenseMaker® terminology, patterns refer to how the visualised data appears, e.g. evenly dispersed, in clusters or as outliers (23). Toggling between quantitative and qualitative data during interpretation allows for more deeply nuanced analysis; also, additional information can be used to further refine the analysis e.g. using demographic data as a filter on the data.

A secondary purpose of this study is that of reflecting on the relevance of SenseMaker® as a research tool. Comprehensive narrative analysis is not a normal part of SenseMaker® studies, yet for the purposes of reflection, a comprehensive narrative analysis was carried out and used to triangulate the other findings (23). The findings are captured in Chapter 6 (page 119).

4.5.1 Generic design of SenseMaker® surveys

The generic SenseMaker® framework is first described, followed by a description of the theoretical constructs for this study. SenseMaker® studies are designed with no preferred or expected answer, and the self-interpretation are hard to 'game' or manipulate (23).

4.5.1.1 Prompting question and title

The prompting question situates the storyteller in a familiar situation. It uses applicable trigger words to activate a specific mental framework and to locate the responses that follow. The prompt is designed to be purposefully broad, so participants can choose the specifics and depth of their story. An overly prescriptive prompt would focus the stories too narrowly (29). After sharing a story, the storyteller is asked to provide it with a title that provides another layer of analysis and meaning-making.

4.5.1.2 Signifying the story

For the purposes of self-analysis, a mix of signifiers types, e.g. stones, triads, dyads and multiple-choice questions, are used – each with their own goal and style. All these concepts will now be explained in more detail.

4.5.1.2.1 Stones

Stones are big dots that mark a place on a rectangular canvas. The axes along the sides of the rectangle describe ranges of two aspects of the story. The participant receives a limited number of stones, which can only be placed once (104).

Stones provide insight into different perspectives on the same aspect and is considered more evaluative than triads. The placement of the stones in relation to each other is of more importance than the actual placement (29).

4.5.1.2.2 Triads

Triads are triangular grids, with labelled variables forming the corners. The interior of a triad represents the relative proportions or weights of the three corner variables, while the storyteller is tasked with placing a dot anywhere inside the triangle to show how the variables trade off against each other.

Triads are designed not to have a with no preferred answer (29); they are analysed to understand the dynamics of a system, as well as its underlying theoretical constructs (104).

4.5.1.2.3 Dyads

A slider is positioned between two extremes on a linear scale, with one extreme indicating the underlying construct to be completely absent and the other extreme it being present in excess. This may appear similar to other commonly used linear scales, but the difference lies in the fact that the preferred state is somewhere in between the two polarities (104). This forces attention to a full range of variety that pertains to the situation (42).

Dyads are used to explore underlying beliefs and are especially useful in measuring the strength of these beliefs, so as to interact with and attune a system, e.g. attitudes on teamwork (29).

4.5.1.2.4 Free-text metaphors

Metaphors are a mostly unconscious mechanism of thought that is expressed through language. The metaphors, language and narrative used are linked to neural pathways. If used

repetitively, it becomes a fixed neural pathway meaning that it is used automatically and not in a way where people reflect on what they say, yet what they say has a direct influence in how they respond to a situation (195).

Because metaphors are repositories of emotional and previous exposure that govern how people think about the current situation – the use of metaphors may trigger endocrine responses.

4.5.1.2.5 Multiple-choice questions

SenseMaker® surveys generally include two sets of multiple-choice questions, both of which are used to filter the other data. The first set relates to the question e.g. emotional tone or how frequently the events in the story occurs.

The second set collects demographic information in order to probe the perspectives of different groups in the study. The demographic set of questions is purposefully placed at the end of the survey, to reduce self-stereotyping (also called patterning) and bias during self-analysis. It should also prove easy to answer, even if a participant is cognitively fatigued from the earlier parts of the survey (104).

4.5.2 Theoretical constructs and survey design of this study

The recommended layout of Cognitive Edge that was detailed in the previous section was used to design the survey, with care taken not to make it too long or to allow it to carry too high a cognitive load. The theoretical basis was the steps in the process of sense-making; under each heading, it is clarified which aspect of the theory the signifier for self-interpretation explores.

4.5.2.1 Prompt

Participants were asked to tell a story about working in the EC that was suitable for a new colleague; this was deemed a familiar situation to most participants.

This sort of prompt was chosen because the institutional memory of the EC is shaped by the stories that are told about it, and new members of staff are socialised into what is considered normal and plausible when working here. Within the stories told there are subtexts related to power, procedure and culture (16, 17, 24).

4.5.2.2 Sense-making starts with flux

A dyad was used to test what the participants believed regarding the influx of data and information and whether they deemed themselves overwhelmed by the influx, therefore potentially missing some cues; or if they deemed adequate information to be lacking.

4.5.2.3 Noticing a cue

A triad explored three potential variables that have been shown to cause uncertainty in ECs namely inadequate understanding, incomplete information and undifferentiated alternatives (57).

This triad provided insight into the mental framework of the storyteller as well as providing insights into their cognitive load, as uncertainty elicits a high cognitive density (2).

4.5.2.4 Bracketed

A triad and a dyad were used to see how abnormalities could be bracketed. The triad tested what happens when information and explanation don't match, and variables were taken from the data/frame model (Figure 2, page 22), e.g. would the sense-maker elaborate, question data or accept mismatched data without question (39). Often noticing the discrepancy between expectation and reality is what triggers sense-making (4). A dyad was then used to consider the extreme consequences of bracketing, e.g. if the consequence were blindingly obvious or completely uncertain.

4.5.2.5 Labelled

The vocabulary used to label a cue provides insights into how they view event, and thus provides insights into their mental structures (121). How the situation is labelled occurs after bracketing, i.e. the two concepts are closely related.

Here, a triad provides information on staff members' perceived ability to speak up when they disagree or noticed something worrying. This ability to speak up depends on self-views, professional identity and social conditioning. Psychological safety in the EC also plays a role here and it provides some insights into management behaviours. This triad may provide insights on inattentional blindness, as well as perceptions regarding psychological safety i.e. if they feel that they can speak up.

4.5.2.6 Presumption

Two triads were used to test presumptions, where the first triad considered ideology, situational awareness and views on management.

The second triad considered presumptions on the role of the manager – with the three variables being guiding and leading, securing resources and external coordination.

4.5.2.7 Action

Three triads were used to explore what informs action, assumptions about how others should act, and the perceived pressure to act. Action precedes cognition and focuses the attention on what the storyteller felt should be happening next; this depends on perceptions regarding authority, interdependence and insight (4).

The first triad explored mental frameworks using the variables experience, rules and situation. These show whether actions are informed by what has worked before (experience), the rules, or if they act according to the needs of the situation. It is possible that some insights may be gained into the authority to act and inattentional blindness.

Next, a slightly differently worded triad considered how they reckoned other people should act – according to experience, training or orders (18).

And, finally, a third triad considered whether the perceived pressure to act was based on satisficing, consequence or time pressure (18).

4.5.2.8 Social, systemic, communication and language

To explore the social/collective aspects of sense-making, a triad was chosen to explore the dynamics, with a dyad to determine underlying beliefs and a stone to evaluate perspectives. The triad considered three sources of power in the organisation, namely team structure, social agreement and ideology; the stone evaluated perspectives related to who concerns were shared with during normal (one axis) and crisis (the other axis) situations; while the dyad focused on beliefs as to the most effective communication methods during challenging situations, i.e. formal or informal.

4.5.2.9 Boundaries and structure

A dyad was selected to explore the perceived levels of trust, with the extremes being located at complete trust and no trust. This dyad provided insights on team cohesion, psychological safety and thus trust, as a pre-condition in collective sense-making.

4.5.2.10 Ideology

The aspects of ideology were covered by four triads already mentioned: role of the manager, power to influence, acting based on orders, and acting based on authority.

4.5.2.11 Emotional tone

A multiple-choice question was used to establish the emotional tone underlying each story that was shared.

4.5.2.12 Identity, role in the story and formal role

Here, a dyad, a multiple-choice question related to the story, and two demographic multiple-choice questions were used. The dyad showed attitudes on individual versus collective decision-making, i.e. whether there is collective sense-making in the EC and whether people act completely independently of others (9).

The story-related multiple-choice question focused on the role each participant took in the story they had told. Even though role may be circumstantial, people generally gravitate towards similar roles, e.g. the link between groups, following orders, making decisions (84).

Formal role and profession were covered in the two demographic multiple-choice questions, which were then used to filter and determine the presence of stereotyping.

4.5.2.13 A plausible story

Two triads were re-used to consider the plausible stories uncovered in the EC. Firstly, those triads that considered what actions should be based on, i.e. stories about things that had worked before, situational assessment or the rules; and the triad that considered sources of uncertainty. Thereafter, the dyad considers the consequence of the decisions as obvious or uncertain.

4.5.2.14 Give your story a title

The chosen title makes a statement as to the meaning and emotion assigned to a story.

4.5.2.15 Working in the EC is like…

Participants were encouraged to write freely about what metaphor came to mind when thinking about working in the EC. People often represent their thoughts, behaviours and experiences with metaphors (36).

4.6 Sample and testing

Because there are no parameters to estimate (yielding precision requirements) or hypotheses to test it (yielding power considerations), there is no required sample size for a SenseMaker® survey. But, the more stories collected, the greater the voice of the people involved (23). The only precondition to deal with was that of proportionally representing both roles (i.e. doctors and nurses) equally.

4.7 Data collection

A link to the web-based SenseMaker® instrument was emailed to all potential participants. This included all category doctors and nurses working at the five large public ECs chosen, all of which are located in the Cape Town metropolitan area. Page one of the web-based instrument contained the consent form that was approved by the Human Research Ethics Committee, and participants were required to give consent before they could proceed to the rest of the survey. Page two contained demonstrations that the participants had to answer to see how to answer the rest of the survey.

Contingency plans to collect sufficient stories included frequent reminders, reverting to a mix of paper and electronic surveys, and extending the data collection period. All SenseMaker® data was stored in a secure third-party database, while any paper copies or written notes were kept securely at an off-site location.

4.8 Data analysis

4.8.1 Analysis 1: Thick description

Findings were described and, where possible, tabulated in simple Microsoft® Excel® for Office 365 MSO spreadsheets. The purpose of the descriptive study was to outline the conditions, formal structures and physical layout of the EC environment. As this is a non-hypothesis study, no statistical analysis took place and there was no attempt to determine causal relationships. The observations and interviews were tabulated under headings derived from the 7S model (Figure 7, page 74) with additional observations recorded in a notebook. At least two handovers were observed in each EC, and these were compared across the three ECs. Pictures were taken of posters, notice boards, organograms and policies, with some of these photos presented in the findings chapter. Documentary sources were accessed and compared across the three ECs (Chapter 5, page 92).

4.8.2 Analysis 2: SenseMaker® survey

The collected data was captured into SenseMaker® Analyst software, from where it was exported as a comma separated values (csv) file. It was then uploaded into R Studio version 1.1.463 (2009 to 2017), for statistical exploration of the quantitative data using simple exploratory techniques and visualisation. R Studio is a programming software environment used for statistical analysis, graphics representation and reporting in the R language.

The standard formats of the signifiers, e.g. triads, each yield characteristic types of data that can be visualised in R studio in different ways. For example, triads represent a mix of three corner variables and can be plotted on a ternary coordinate system with three components. This is visualised using an R-package specifically for ternary plots, namely ggtern (version 3.0.0.1). Density curves of dyads are plotted on the normal Cartesian coordinate system, using ggplot2 (version 3.1.0). Another package for visualisation, ggridges calculates density estimates and then creates partially overlapping plot lines using ridgeline visualisation (version 0.1.5).

Each signifier is first plotted, then inspected for patterns, after which the patterns are explored, i.e. filtered with categorical or ordinal data, such as profession, emotional tone or role in the story. Only the most appropriate and strongest patterns are included in the final report.

After early pattern recognition, repeated regularities are categorised and, finally, stories in areas of interest are read. Stories in areas of interest were accessed in the SenseMaker® Analyst program. This approach reduces potential bias, e.g. prevents only recalling high-impact stories. The additional narrative analysis is done last (23, 104). The SenseMaker® results can be read in Chapter 7 (page 140).

4.8.3 Analysis 3: Narrative Analysis

In the SenseMaker® methodology, narratives are used during collection to place the participant into a specific situation, whilst during analysis, narratives are used for illustration and to identify possible probes. In this study, additional narrative analysis was used to reflect on the usefulness of the SenseMaker® tool and to strengthen its findings and interpretations. The method followed to analyse the narratives was a simplified version of content analysis methods described by Rogan and De Kock (in education), and Erlingsson and Brysiewicz (emergency care) (196, 197). It is simplified because there was only one question and some participants only provided a one-liner answer. The narrative analysis was done manually. And

as mentioned to interpret stories during the SenseMaker® study analysis, the narratives were accessed within the SenseMaker® Analyst tool.

Narrative analysis was carried out using a systematic method to reduce biased interpretation, which followed these steps (196):

1) Narratives were extracted from the SenseMaker® Analyst software and exported as story table into an Excel spreadsheet;
2) The story table contained the following headings: actual narrative number, scrambled narrative identity number, emotion as rated in SenseMaker®, story title, story and metaphor (working in the EC is like…);
3) The complete story set was only read after the SenseMaker® analysis was done;
4) Familiarisation: I immersed myself and read all the stories twice, prior to any preliminary analysis or theme identification;
5) I kept track of my emotions and thoughts in a hand-written diary;
6) Keeping the initial goals in mind, I initialised themes according to the conceptual framework, e.g. looking for cues, labels and the nature of interruptions;
7) I took note of other themes and trends e.g. word repetition, recurring problems and note language usage e.g. triage, support, team;
8) The themes identified were named;
9) Connected the themes to find patterns, e.g. recurring problems, emotions;
10) I grouped together statements that provide an understanding of how participants experienced 'interruptions';
11) The themes were checked against the descriptive study and other SenseMaker® data; and
12) The themes were analysed considering the themes in terms of process, functions, and tensions. I added together statements that provided an understanding of how participants experienced 'interruptions'.

The findings of the narrative analysis can be read in Chapter 6 (page 119).

4.9 Ethical considerations

Ethical approval was obtained from the University of Cape Town's Health Research Ethics Committee (HREC 487/2017), after which permission to conduct both phases of the study at the selected ECs was obtained from the Western Cape Department of Health.

Anonymous data will, in the future, be shared for academic purposes only, and no information will be released that links specific individuals to their stories. The stories were

not attached as appendix due to identifiable information some storytellers shared in the stories. Data access was restricted, during the study, to the research team and, during site visits, notes remained with the investigator or were kept securely off-site.

During analysis, care was taken not to slice the data too finely as that had the potential to compromise anonymity. The SenseMaker® tool does not save meta-data sequentially, but instead scrambles it to further reduce the possibility of participant or location identification (104).

During the descriptive study, the presence of an observer may have elicited stress; thus, special attention was paid to people's rights in not coercing them or invading their privacy.

Research-related injuries were unlikely while sharing a story. However, if participants demonstrated strong emotions while sharing their information, a follow-up was scheduled with them. Informed consent was obtained for both phases of the research.

4.10 Trustworthiness

The study was designed to be aligned with the social constructionist paradigm and to align with sense-making ontology and epistemology, while meeting the criteria of a rigorous process. Measures and requirements for validity were determined by paradigm and design. Although these remain contentious in qualitative research, the traditional quantitative and more positivist measures were not deemed appropriate (198). Thus, the following measures were used to ensure trustworthiness.

4.10.1 Transferability

The study was designed to explore multiple, contextualised perspectives about what is currently relevant to and believed by the study participants. Transferability can be achieved by producing a thick description of context including detail, dimensions of social behaviour and explanation of the environment (19). The study is not aimed at being generalisable, nor could it be replicated with the same results. Occurrences in complex human systems are not repeatable and, even though it is possible that some themes may be generalisable to the process of sense-making and typical responses, it is not a suitable measure of the study and the study is not designed to build repeatable, predictive models of sense-making (199-202).

4.10.2 Reflexivity

A personal and research narrative have been acknowledged (193). To show the researcher's personal narrative, a self-critical account of self-dialogue was kept as part of the reflexive

journal and a reflection of which forms the final part of this chapter. This account provides information on the logic of the process, makes conclusions traceable and increases rigour (191, 200, 201).

Dependability refers to whether the reader is convinced that the findings occurred as reported; to increase dependability, the study was designed with overlapping methods, field notes were kept, as well as a self-analytical reflexive journal that forms the final part of this chapter (200).

4.10.3 Adequacy of data

This can be determined in two ways: firstly, by the number of stories included and, secondly, by the variety in the kinds of stories told.

There is no required sample size in this type of study, yet to make the findings more representative of multiple perspectives, stories that proportionally represent different categories of nurses and doctors were aimed for.

Furthermore, a variety of stories about different process conditions were required.

4.10.4 Credibility

There was prolonged and regular engagement with participants during the first part of the study. The findings of the descriptive study were compared across three ECs, and confirmed within the ECs by checking documentary resources and interviewing both doctors and nurses (198, 200).

4.10.5 Fairness

The study aims to hear multiple perspectives and to give proportional representation to both doctor and nurse groups. To enhance fairness, paper-based copies were made available to not exclude those that are not computer literate or do not have access to the internet. The interviews and SenseMaker® survey were completed in English, a language that is used daily in health settings throughout the Western Cape.

4.10.6 Bias

The risk of unintentionally superimposing bias during the interpretation phases was reduced because participants interpreted their own narratives; i.e. the researcher remained external during early analysis. The approach was designed to minimise bias (Section 4.3.4, page 72)

Keeping a reflexive journal and self-appraising (Section 4.11, page 87) further maintained this neutrality.

4.10.7 Verisimilitude

The quality of the data had to be plausible and sound true (193, 200). In this study, data quality was achieved in various ways – firstly, by participants self-interpretation their own stories and, secondly, because SenseMaker® allows for multiple interactions and perspectives. The agreement between the parts of the study allows plausible stories to become probable stories.

4.11 Reflexive journal

Reflexive journaling has become common place in social research fields such as anthropology and sociology. It serves to increase trustworthiness and acknowledges the involvement of the researcher in the research process (191). The process of reflexive journaling implies acknowledging that the researcher is not separate or neutral to the study, but firmly part of it (203). The researcher uses reflexive journaling to question and acknowledge their own truths in an attempt to avoid overpowering the study with their own story (204).

Throughout the project, I kept a journal, and by analysing it I was able to merge my main thoughts, self-conversation and biases. It follows the path of the research, starting with the topic, method and stance, and following through with data collection, analysis and discussion.

The topic was influenced by my curiosities and resulted from questions that kept surfacing throughout my career in healthcare. I have worked in diverse settings and fulfilled multiple roles – nursing versus paramedic, critical care versus emergency nursing, pre-hospital versus in-hospital, team member versus manager. In each role I was introduced to established codes of conduct on how to, or how not to, do things, as well as the thinking behind these codes. Some of these roles I worked in concurrently, and I became acutely aware that I held alternative perspectives to those who only had experience within their specific role. Often the established codes of conduct seemed to be in conflict with similar processes in the other roles.

This led to my initial understanding of organisational culture and team dynamics. My interest in these topics was further flamed whilst working as a remote medic on an oil platform where I was exposed to a ‘safety’ culture and experienced the impact of a management/efficiency coach.

I formalised my personal research and reading by undertaking formal studies, including a Master of Business Administration (MBA). This resulted in an opportunity to teach business and communication subjects at tertiary level for Fast-Moving Consumer Goods (FMCG). Often healthcare improvement articles mention learning from aviation; FMCG (e.g. the MacDonald Franchise) might be another industry that healthcare can learn from. Potential guidelines could be how to manage variable demands and supply chains across the African continent as well as other logistical factors that characterise managing FMCGs.

As I have spent the past decade conscientiously learning about management, organisations, culture and people (across roles and industries), it was unavoidable that I would choose a topic that considered interprofessional dynamics, collaboration and operational matters. The topic was validated by a deeply held belief that research (academia) is only useful in so far as it informs praxis and that the voices of those on the frontline are the ones that needed to be heard.

The stance taken directly impacts on how the voices of the participants are heard. I narrowed it to three potential approaches, namely social constructionist, critico-ideological and interpretivist. I decided on the social constructionist approach as it would equalise all voices and it was the most appropriate way to study the process of sense-making as phenomenon that is collectively (socially) created (constructed) by people. Further, social constructionists are strongly influenced by the essential role of language and stories to produce a shared/social reality (34, 83).

Another choice I had to make was whether I position myself as an insider and outsider, both offering advantages and disadvantages. As an outsider, I could consider the EC in a naïve way, whereas as an insider I could potentially gain faster access to information and build trust, but that would carry a risk of being stereotyped by the EC staff. A potential risk with associating too much with the insider stance was that I would glance over routine practises. Over-familiarisation with processes could lead to false assumptions.

Using the SenseMaker® tool allowed extracting insider information, and I decided that for the rest of the study I would hold a hybrid insider/outsider position (203). I would introduce myself as an outsider and researcher and conduct the initial part of the study, e.g. naïve questioning of basic processes, as such. However, if I deemed that I would gain more valuable information if the person I was interviewing knew that I shared a background in Emergency Care, I would boundary hop and present my insider position. It should be noted that as I have not worked as a full-time employee in any of the hospitals chosen for data collection, I could not be a complete insider.

During my visits to the ECs, I was continuously questioning my personal assumptions. Prior to each EC visit, I wrote down my thoughts, expectations and assumptions and reflected on them. After the visit, I would re-evaluate my reflections. This helped me to remain receptive of findings, such as when the narratives showed that doctors were in tune with nursing obligations and difficulties, I realised that I held a bias of doctors being oblivious to the nursing function. This bias was fuelled during interviews when some nurses, without prompting, commented that the doctors do not understand how much the nurses do.

Because I was consistently examining my own beliefs, I was able to explore this finding, even though it contradicted my personal assumptions. As the study progressed, this level of enquiry seemed to deepen, and I was surprised to discover 'new' deeply held beliefs. Following a non-hypothesis method allowed me the ability to question such and other assumptions that in a hypothesis led study, would have been impossible.

The most challenging part of the study was to stay focused and patient while visiting the ECs. I became exasperated with the lack of communication; this was discussed as a finding in the self-interpreted analysis. For example, I would confirm an appointment, only to arrive and find that either the person I had the appointment with was absent, or the manager did not inform staff that I would be there, such as during nightshift or at handover. This resulted in staff stating that they were not allowed to engage with me without their manager's consent, despite me having printouts of the confirmation.

The poor communication methods made attending two handovers, one from each discipline on the same day, complicated. It was problematic negotiating my way through this phase of the study and to remain neutral towards the staff and management. I was unprepared for how tough it would be to not let my assumptions and emotions influence my ability to collect data, and I felt severely drained after each EC visit.

During visits I was constantly reminded of the quote in Winnie-the-Pooh – "…*here is Edward Bear, coming downstairs now, bump, bump, bump, on the back of his head, behind Christopher Robin. It is, as far as he knows, the only way of coming downstairs, but sometimes he feels that there really is another way, if only he could stop bumping for a moment and think of it."* A.A. Milne

I felt that people accepted the chaos and disconnect because they were unaware that there might be different ways of doing things but were resistant to entertaining such ideas. I hold the bias that staff in the EC defer queries without attempting to resolve the problems themselves. I believe that this is because of an underlying thought process where, when

someone in the EC is unsure of an enquiry or process, they simply tell you that it is not their job or responsibility and to find the solution with someone else.

Another possible complication that I needed to be consistently aware of was cultural differences. As a white female, my views may be very different compared to, for example, a black male working in the same environment. By using a method based on self-interpretation of their stories, the bias of cultural heritage is largely reduced.

The data analysis held perpetual surprises with many emerging themes, new questions and combinations of data to explore. I was taken by surprise with the intensity of the stories, and I asked myself whether the stories were appropriate when considering the elicitation question that prompted people to share a story with a new colleague regarding a typical day. I speculated whether it could be that the participants felt that they had an opportunity to unpack their frustrations in a safe environment?

Above all, while reading through the stories I felt humbled by the vulnerability and openness of the staff. I felt a responsibility to do them and their stories justice and even though the overall narrative in this study might be read in my voice, the story told is not mine – it belongs to those in the ECs.

Using a narrative method with the SenseMaker® tool is ideally situated to elevate the voices and explore issues that emergency care research in South Africa seemed to have shied away from – how people work together, communicate and share information. These topics are becoming more and more prevalent. In order to stay relevant and constantly improving, we need to keep asking: How do we hear everyone's voices? How do we tap into tacit knowledge and networks?

My quixotic dream is that this study would be a resource that provides practical and theoretical guidance on how to develop and improve EC systems in South Africa, and the rest of Africa. A question that cropped up regularly while writing up the study was whether I met my intention of doing an applicable study, and who the judge of the practicality should be.

In part, the purpose of the reflexive journal was to acknowledge how my bias, assumptions and theories-in-use contributed to the strength of the study and limited the research process. Reflexive journaling is more than mere reflection, it is challenging one's mental frames and beliefs. Due to the journal, I was able to observe how my attitudes and thoughts shifted throughout the study. The constant self-questioning definitely helped to keep my curiosity naïve and fresh.

I would strongly encourage anyone that is undertaking qualitative research to have external reference points. I had a few key people that would question my deductions, challenge my

‘normal’ and point out the assumptions I was making. The one bias that we all seemed to share (in my opinion) was a shared belief that the keepers of the South African healthcare system have a lot to answer for.

Chapter 5: Descriptive study

5.1 Introduction

This chapter considers the observational and descriptive data of the study. The observation methods included structured observation according to the 7S framework, and unstructured observation of operations and social interaction. Interviews included semi-structured, following the 7S framework questions and naïve questioning (Figure 7, page 74 and Section 2.8.2, page 36). In each EC, the policies, procedures, checklists and other governance files were accessed.

The formal structures in each EC, e.g. policies, procedures and files, are described and compared between doctor and nurse hierarchies. They are also compared with other ECs, and informants of formal processes have included separate doctor and nurse managers. Verbal permission was obtained to take pictures of notice boards, organisational charts and other notices of interest.

Semi-structured interviews were held with 19 participants, this included questions regarding daily management, information flow, tracking of patients, stall allocation and resource management.

A total of 53 hours was spent observing EC operations – 12 hours on night shift, and the remainder during the EC working day. During this time, unstructured interviews and the naïve questioning of staff was carried out on the floor.

In each unit, at least two discipline-specific handovers were attended, totalling four handovers per EC. The two disciplines' handovers were attended on the same day to compare and match the information exchanged.

To supplement and verify the data, appointments were made with a Human Resources department representative at each facility, and the Financial Manager of Mitchells Plain District Hospital assisted with insight into budgetary procedures and accountabilities.

This chapter contributes to objective one, which is to contextually place the EC by doing a thick description of a sample of ECs in Cape Town. The chapter layout starts with a broad overview of the organisational structure in the EC, patient flow, information flow, boarding and physical structure, before turning to teams and other resources.

5.2 General EC Structure

5.2.1 Organisational structure

Structures are typically visually represented in the organisation using a diagram that depicts each department with their hierarchical positions. Evidence of typical bureaucratic structures were present in all ECs, e.g. visible organisational charts that depict hospital and nursing chains of command (Figure 8 and 9). The EC doctors and nurses are divided into different departments with different vertical chains of command in which communication and information are contained. There is no indication of horizontal integration of EC operations on the organograms. This means that there are different agendas between the two professional groups, and it might hamper the ability to collaborate.

The nursing organograms tend to follow a typical hierarchy, with each category of nurse reporting to a higher category and centralised nursing authority occupying the top position.

No chain of command was, however, found for the doctors, and none of the ECs had integrated organograms as to how doctors and nurses should communicate horizontally or how their chains of command should overlap. One EC showed a pictorial presentation of how the doctors and nurses should set about their work in the EC, but no chain of command or flow of responsibilities was shown.

All nursing organisational charts showed a relationship with their ancillary services, e.g. ward clerks, housekeeping staff and porters. A dual reporting system is important here, where ancillary services report to both an external manager and the EC nurse manager. This reporting system is centralised at the top, with both external ancillary and nurse managers reporting to nursing management. It was also noted that the nursing hierarchy in all the units had various vertical layers, even within the EC.

EC Doctors were, however, omitted on most organograms – including on hospital organisational charts. Despite the interdependence between nurses and doctors, there was no indication of the relationship and collaboration between the nurses and the doctors.

The following figures that combine all three hospitals show generic chains of command.

Figure 8: Generic chain of command in hospitals

A circle shows the assumed chain of command for EC doctors

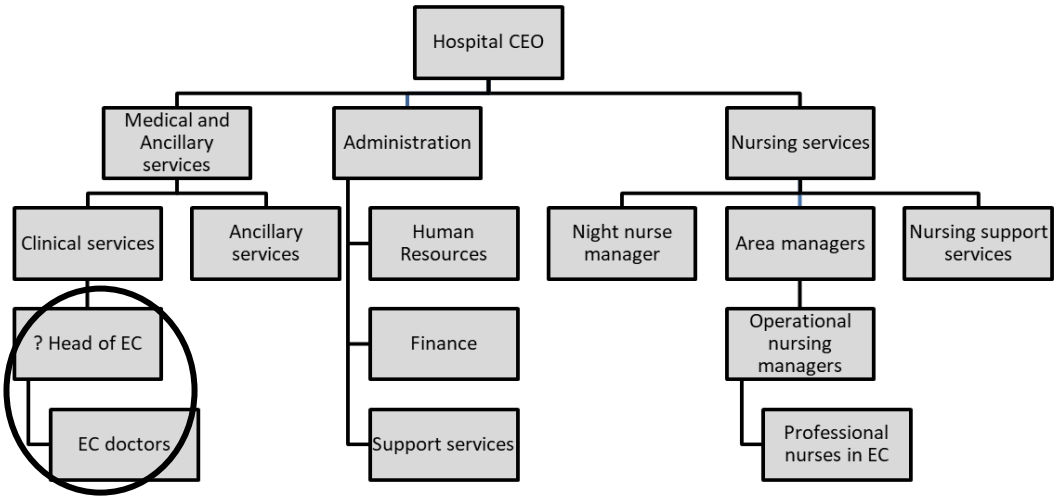
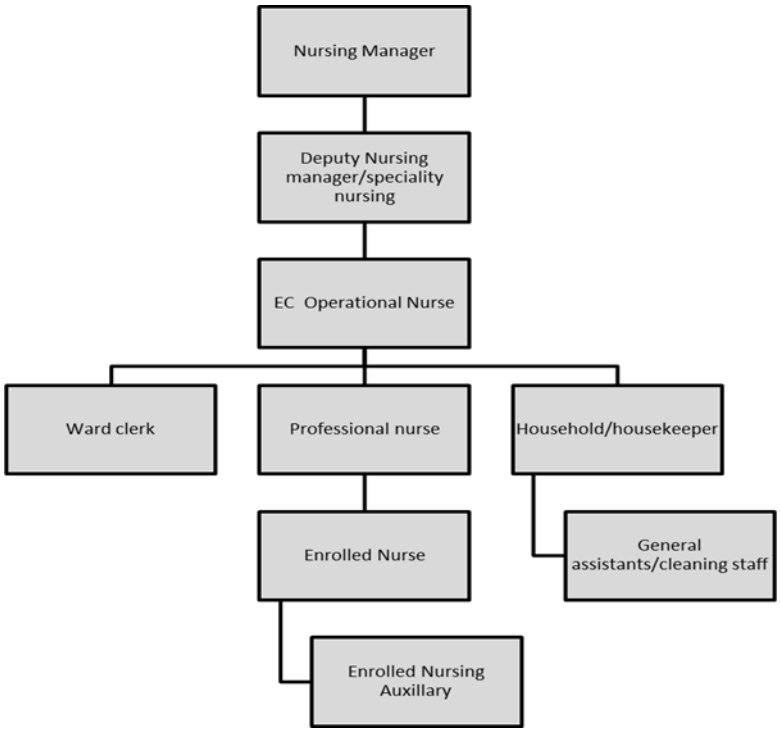


Figure 9: Generic chain of command among nurses



To demonstrate what the implication of Figures 8 and 9 at operational level is: if the nurse checking emergency equipment finds a fault with a defibrillator, s/he reports it upwards within the nursing chain of command. Once a requisition is signed off at nurse management level, the requisition is taken to technical services from where it will go down the chain of command to the technician that will check the equipment. However, there is no indication

on the chain of commands to inform the medical department, which would encompass the EC doctors who, during a clinical emergency, may require urgent access to the piece of equipment.

5.2.2 EC daily management: strategic direction

Each EC has more than one set of vision and mission statements and objectives on its various notice boards. These include those related to the overall hospital, as well as the visions of the EC nurse and doctor, their missions, objectives and strategies.

It was observed that in all the ECs the consultants were heavily involved in clinical care and were present in the EC, while nurse managers were often out of the EC due to meetings or the need to perform other hospital-related duties.

In two hospitals, the EC head and operational managers had separate offices. Interactions between the EC head and operations manager appeared to be opportunistic and sporadic, with no scheduled or routine interaction among them.

5.2.3 Policies

Doctors and nurses had separate operational policy and procedure files, often for the same occurrence. In two ECs, both policy files were kept in their manager's offices and so were not easily accessible on the floor. They were also unavailable when the office was occupied or locked, e.g. after hours or on weekends.

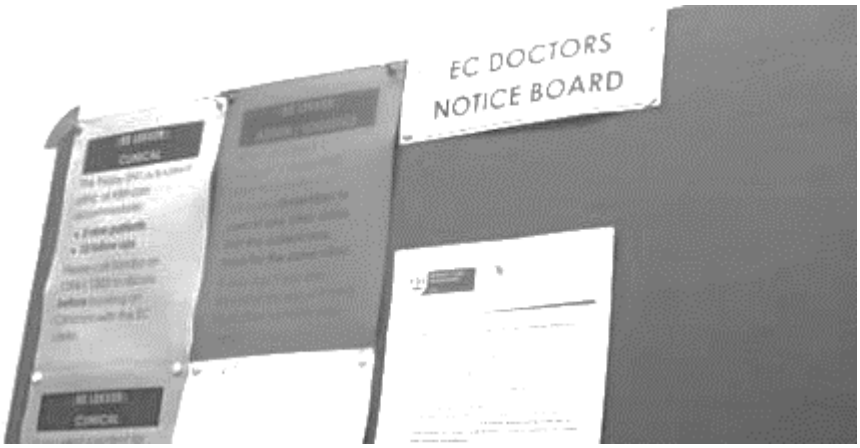
During observation, no staff members consulted or sought guidance from hard copy policy or procedure documents. These were not available in other formats. Comparison across the ECs revealed inconsistencies in content and the availability of outdated provincial guidelines, policies and procedures.

5.2.4 Communication channels

Doctors and nurses use different dissemination channels, with doctors tending to rely more on informal communication methods, e.g. WhatsApp groups. Nurses, on the other hand, tend to rely on formal rules, communications, notices and commands. Only one EC revealed a more informal nursing communication style.

Communication and information flow are restricted to each discipline, i.e. noticeboards, policy and procedure documents are discipline-specific. None of the ECs had a combined informal communication method in place, e.g. an interdisciplinary WhatsApp group.

Figure 10: Example of a doctor's noticeboard



5.3 Flow and patient management

5.3.1 Information flow

5.3.1.1 Handover processes

In line with provincial guidelines, both disciplines had two handovers within every 24-hour cycle (205). The guideline states that the whole team should be present, and there is no clarification within the guideline of who the '*whole team'* is.

Handovers were discipline-specific, limiting interdisciplinary knowledge exchange. As seen in Table 6, the information flows were contained within each discipline.

Table 6: Number of handovers attended and staffing representation at the handovers

Aspect	Number	Comment
Number of handovers observed	12	
Nurse representation on doctor handover	2	Occurred in one EC
Doctor representation on nurse handover	0	
Doctor manager at doctor handover	12	Handovers were led by the doctor manager in all the ECs
Nurse manager at nursing handover	6	Operational managers are, at times, required to be part of hospital handover, and this coincides with EC handover
All nurses participate in full patient round	1	In the other ECs, nurses took over patients in their allocated areas

In units where the nurses only take over the patients in an allocated area, the local nurse knowledge and information is contained to that area. If the nurse manager is not present, there is no overall nursing oversight of the EC; the doctor manager leads the doctor handover and thus maintains an overview of the EC.

Nurse handovers coincided with the 12-hourly nurse-shift change at 7 am and 7 pm. Doctors have a handover in the morning and another at mid-afternoon, resulting in a gap of more than 12 hours for collective information exchange between doctors. They work staggered shifts that vary in length, implying that not all doctors on shift have attended a handover.

Doctor allocation is informal and is carried out during each round. Nursing allocation is written down and allocated by the nurse manager or shift leader. In two ECs this was determined the day before.

Most staff relied on memory during handover; very few people in the two disciplines took notes. Transition in care was single-disciplinary, mostly verbal with no standardised template for handover. And it seemed as if the method of handover followed the preference of the person leading it.

Table 7: Summary of findings: handover processes across the three ECs

Purpose of handovers
ECs provide care 24 hours a day with the teams working in shifts. Doctors and nurses have difference shift schedules and the transitions of care, as well as sharing of pertinent operational information, takes place via narrative-based handovers.
Who attends the handovers
In all three ECs the doctors and nurses had separate handovers. Only in one of the ECs was there a loopback from the nursing handover to the doctors' handovers. In another EC it was observed that only the nurses were informed that there is a water outage. This was communicated via the nursing chain of command and the doctors were not informed. Other medical specialities do their handovers in the EC for the boarders, and the EC nurses attend these. No EC doctors are required to attend. In one EC, it was observed that there were four other specialities doing rounds, namely internal medicine, surgery, psychiatry and gynaecology with the EC nurses attending these patient rounds as well. In total, attending handovers took 2 hours 45 minutes of nursing time. All the handovers occurred within the first 4 hours of the 12-hour day shift.

In most ECs the oncoming shift would attend handover, whilst members of the off-going shift would remain 'on the floor' attending to patients.
What information is exchanged during handover
The information that was exchanged can be divided into clinical or patient information and operational exchange. During the handovers, there was often no distinction between these exchanges. Patient information exchange: The types of information exchanged included patient name, age, presenting complaint, management, results, outstanding results, disposal and treatment plan. No standardised template to handover patient information was used. The operational exchange included: Bed management, hospital bed status, allocations for the day, operational information to be aware off and shift leader.
When did handover occur
Nurses: the beginning of day shift and the beginning of night shift, 12 hours apart. There was no set time for the handover and rounds of the other medical specialities. The nursing handover was shorted in all the ECs, and in one EC the nurses only attended handover for the patients that they were allocated to care for. Doctors: twice daily, the morning handover starting between 07h30 – 08h30 and lasting between 1-2 hours. The more crowded the EC, the longer the handover takes. The second handover occurred at approximately 15h00, with no handover in the evening.
Where did handover take place?
Doctors: in all the ECs the doctors did handover from bed to bed, moving through the EC. Nurses: Different methods in each EC. EC1 started at the nursing station, then moved from bed to bed, ending at the nursing station for the daily allocation. EC2 took place in a foyer area. Operational information was exchanged from where the allocation takes place, the nurses dispersed to their allocated areas and took over the patients within their areas. EC3 The nurses only took over patients in their allocated areas and communication was written in a diary that they had to sign. No contact was observed with the operational manager during handover.
Allocation of duties for the shift
Nurse allocation was at times done the day before, prior to knowing the requirements and needs for the present shift.

Nurse allocation was patient and task-oriented, in writing and each nurse had to sign next to their name. Nurses were allocated tea and lunchtimes, without taking into consideration the state of the EC/their allocated area. Doctor allocation was also task-oriented e.g. person responsible for discharges, overnight ward or resuscitation area. The doctors allocated themselves or opted for the area they would prefer working in for the day. The allocations seemed to be verbal or on a whiteboard. Doctors took their tea and lunchtimes as per EC needs and communicated informally with the other doctors regarding their breaks.

5.3.1.2 Flow of patient files and completion of EC register

There are various points of separation between the patient, his or her file and the related flow of information. Each EC had its own methods, which mostly appeared messy and difficult to track. In all the ECs the file containing patient information and doctors' orders are separated, especially during initial therapeutic intervention. Individuals had their own way of dealing with this and no consistent method was observed.

The adoption of technology is not complete, so there is a mix of electronic and written patient information. This separates some results from the rest of the file and the patient and increases the risk of gaps in the flow of patient information. Multiple systems were used to access bloods/radiology results in the ECs studied, and there was limited interface with other hospital data systems.

Paper or written patient information cannot be accessed by more than one healthcare professional at a time, so the use of written documents encourages healthcare providers to update information sequentially (and perhaps prospectively?) rather than simultaneously and may increase the risk of error. Critical information may also be lost due to records not being up to date, or due to the bulk of copies and papers in each file (206).

Figure 11 demonstrates gaps in information flow, which seem to occur especially at times of patient intervention and may increase the risk of clinical error and adverse events. The red areas represent the identified gaps in information flow. Table 8 expands on Figure 11, providing the potential risk identified.

Figure 11: Potential gaps in information flow

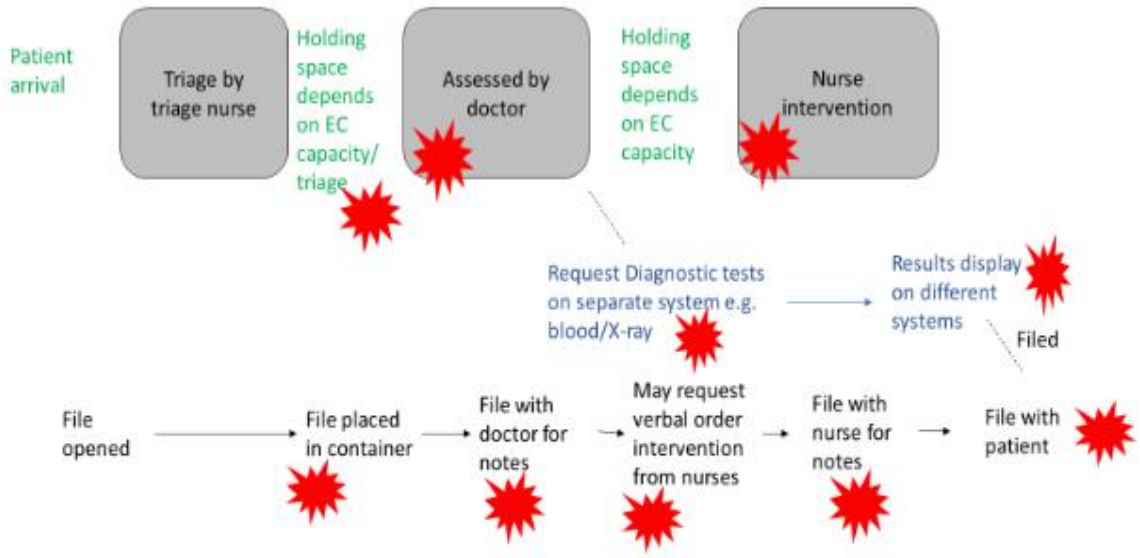


Table 8: Identified risks to information flow

Identified gap	**Potential risk to information flow**
File placed in the container	Wrong triage category Triage information incomplete
Holding space depends on EC capacity/triage	Inappropriate holding space No re-triage or oversight
Assessed by doctor	Patient not found Time wasted searching for patient
File with the doctor for notes	Interruptions Documentation incomplete
Verbal order to nurse	File with the doctor, potential for the wrong patient Nurse misunderstands verbal order The doctor gives an incorrect order
Request for diagnostic tests on a separate system	Delays in request Request not captured in the file Wrong patient request
Nurse intervention	File with the doctor, potential for the wrong patient Nurse misunderstands verbal order Cannot check file
File with nurse	File not found while diagnostic tests are done Interruptions, documentation incomplete
Results from diagnostics	Transcribed incorrectly
Filed	Not filed or filed incorrectly
File with patient	Wrong file with patient Incomplete file

5.3.1.3 Completion of the EC register and electronic information

There was no consistency across the ECs in the number, type and level of responsibility of keeping EC registers. Table 9 shows the observations made in each EC. Note that in EC3 the responsibility was not clarified - everyone was expected to update the register, but whether this works in practice is unclear.

Table 9: EC register and electronic information

	EC 1	**EC2**	**EC3**
EC register information updated by	Triage nurse	EC doctor	Nurses, doctors and reception staff
Additional registers kept	Referral register porter register, resuscitation register	Referrals are kept on sheets of paper on notice board	Referral register
Picture Archiving and Communication System (PACS)	Yes	No	Yes
Ambulance arrival system	Yes, not in use	No	Yes, out of sight of clinical staff though

5.3.2 Patient acuity

EC patient acuity, as triaged in September 2017, was combined and averaged. Approximately 80% of all triaged patients presenting at an EC during the month required urgent (yellow) or very urgent (orange) treatment (Table 10). A further 7% (red) involved life-threatening emergencies that needed immediate intervention.

The provincial benchmark is that very urgent patients are seen within 10 minutes of triage, and urgent patients within one hour. Thus, during September 2017, 80% of patients needed intervention within an hour or less, with 7% requiring immediate intervention.

It is standard practice that members of the EC team will interrupt their current task/s to attend to emergency cases. The length of emergency intervention is unclear and generally, the more serious the condition or the more interventions required, the longer the interruption. Regardless of the nature of interruption, the team members remain responsible for their other patients/tasks that occupied them prior to the interruption.

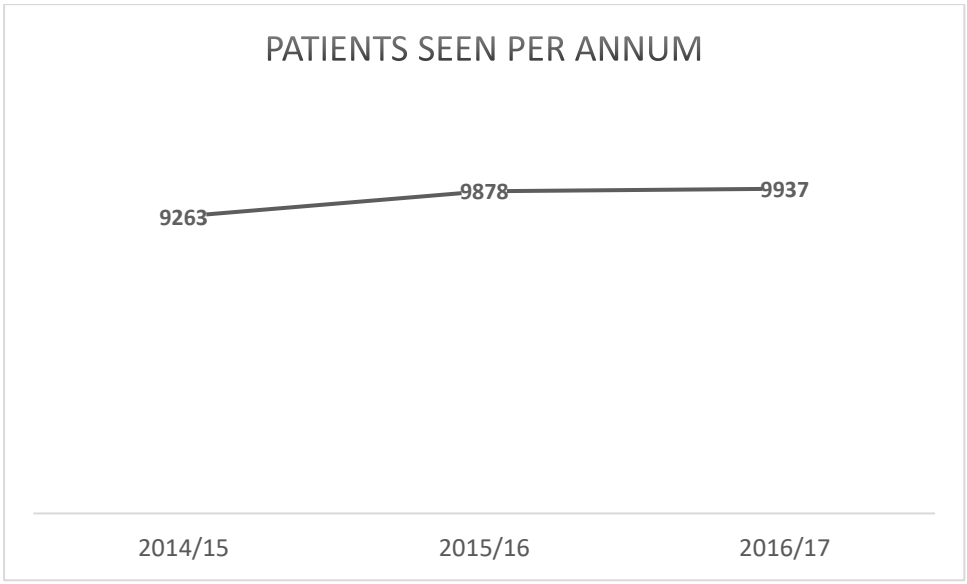
Table 10: How ECs are geared to meet triage targets

	EC1	EC2	EC3
Total staffing (doctors and nurses)	55	38	57
Average patients per month	2 687	3 500	3 750
Average patients per day	112	146	156
Inflow of patients per hour	5	6	7
Total staff available per patient	0.02	0.01	0.01
SATS acuity as rounded percentage (September 2017)			
Triaged Red	0	8	7
Triaged Orange	42	41	41
Triaged Yellow	34	48	37
Triaged Green	24	3	15

EC2 has the lowest number of total staff, yet the highest yellow/orange acuity. This implies that the staff in EC2 are more likely to be interrupted, and therefore to deliver fragmented care.

Figure 12 shows the average total number of patients seen over the past three years and a steady increase per annum can be seen. Annual provincial data estimates that patient numbers increase by approximately 5% per annum. According to those interviewed, resources were not adjusted accordingly. However, this could not be verified.

Figure 12: Combined patients per annum



5.3.3 Emergency case load management

All three ECs struggle with operational capacity. The provincial Emergency Case Load Management Policy advocates short-term strategies to alleviate this shortcoming (207). To alleviate EC capacity, the policy describes four escalation levels of mitigating actions for hospitals to enforce. Actions include temporary increases in ward capacity and the interchangeable use of beds throughout the hospital.

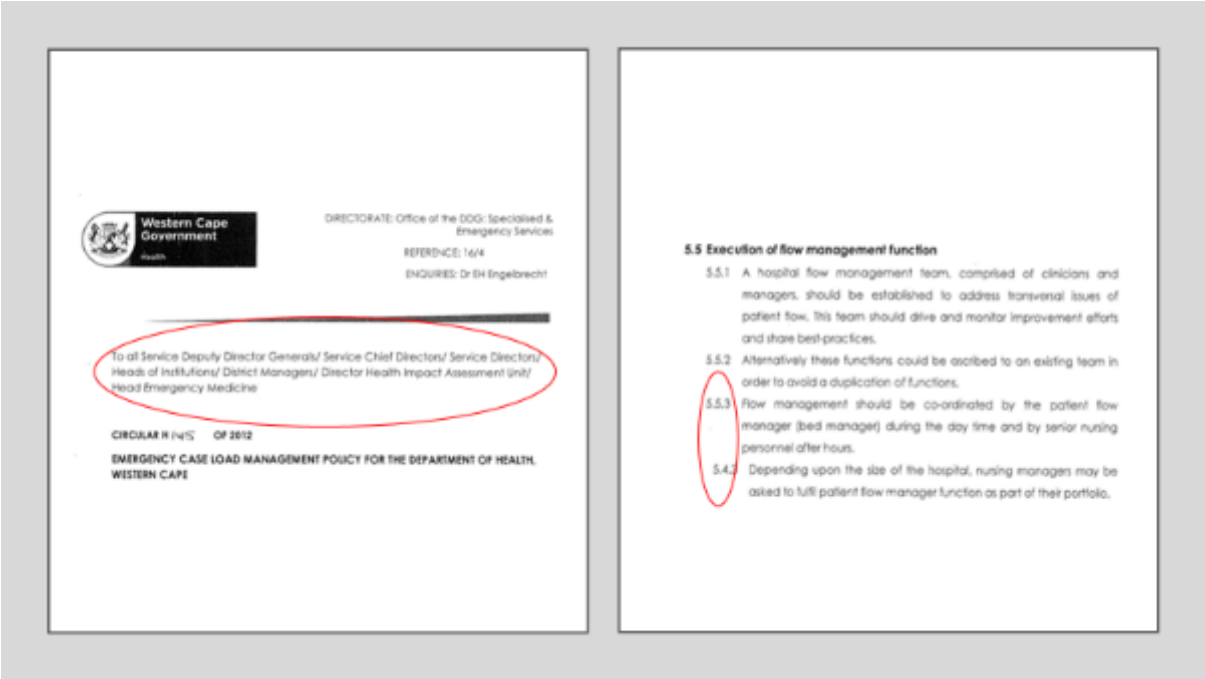
Full capacity status is only reached when the prescribed hospital-wide actions have been implemented, the hospital is at 100% capacity and the EC is overfull with no remaining flat surfaces for patients to be seen. The final escalation step is then implemented, which is a provincial request for ambulance diversion to provide temporary relief.

The policy contains a few ambiguities and muddled overlaps in responsibility:

- The policy requires a hospital-wide mitigating action but, should hospital management not implement the action, the EC team remains stuck in the crisis. During observation, this situation occurred twice: the EC was beyond capacity, with no remaining flat surfaces, and was not able to divert ambulances or move patients; and
- Nursing management has not been included as a stakeholder on the provincial policy yet. As stipulated in the circular, ward bed-flow management is a traditional nursing function. Further, in all three ECs, bed management remained a nursing function that was an allocated duty. This discrepancy is highlighted in Figures 13 and 14 - the circle shows the allocated staff.

In contrast, implementation of the diversion protocol falls with the EC head, with no mention of the EC head conferring with the nurses who are responsible for the co-ordination of bed management. Additionally, the EC operational manager is not on the list of people to be notified when a diversion protocol should be implemented (Circled in Figure 13).

Figure 13: Circular addressed to stakeholders, excluding nurses, yet described nursing roles



Western Cape Government
Health

DIRECTORATE: Office of the DDG: Specialised & Emergency Services
REFERENCE: 16/4
ENQUIRIES: Dr EH Engelbrecht

To all Service Deputy Director Generals/ Service Chief Directors/ Service Directors/ Heads of Institutions/ District Managers/ Director Health Impact Assessment Unit/ Head Emergency Medicine

CIRCULAR H [illegible] OF 2012

EMERGENCY CASE LOAD MANAGEMENT POLICY FOR THE DEPARTMENT OF HEALTH, WESTERN CAPE

5.5 Execution of flow management function

5.5.1 A hospital flow management team, comprised of clinicians and managers, should be established to address transversal issues of patient flow. This team should drive and monitor improvement efforts and share best-practices.

5.5.2 Alternatively these functions could be ascribed to an existing team in order to avoid a duplication of functions.

5.5.3 Flow management should be co-ordinated by the patient flow manager (bed manager) during the day time and by senior nursing personnel after hours.

5.4.4 Depending upon the size of the hospital, nursing managers may be asked to fulfil patient flow manager function as part of their portfolio.

Figure 14: Notification process for diversion, the EC operational manager excluded/not notified

PART A

DATE: _____ TIME: _____

REQUESTED DIVERSION: ALL PATIENTS ALL STRETCHERS
RED PATIENTS 1:1 OTHER

REASON FOR REQUEST: _____

DIVERSION REQUESTED BY: _____

EC CAPACITY CURRENTLY: _____

CURRENT LONGEST PATIENT WAITING TIMES:

A) WAITING TO BE SEEN: _____

B) WAITING FOR BED: _____

ESCALATION PLAN ACTIVATED? Y N TIME PLAN ACTIVATED: _____

EC HEAD:	NOTIFIED	Y / N	ON SITE	Y / N
HOSPITAL MANAGER:	NOTIFIED	Y / N	ON SITE	Y / N
BED MANAGER:	NOTIFIED	Y / N	ON SITE	Y / N
MEDICAL CONSULTANT:	NOTIFIED	Y / N	ON SITE	Y / N
SURGICAL CONSULTANT:	NOTIFIED	Y / N	ON SITE	Y / N

5.3.4 EC boarding

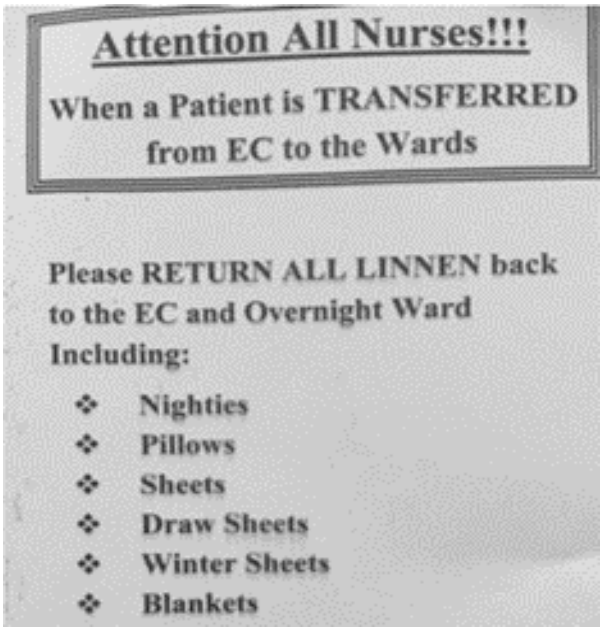
Excessive EC boarding creates a situation where the EC is at capacity, with limited space and resources. It impacts on both doctors and nurses, but it was more obvious and easier to observe the impact it had on the nurses. Nurses remained involved in the care of all patients, even those that had been referred to other departments. This included participating in ward rounds, e.g. surgical. The ward rounds delay and hinder them from carrying out nursing care and/or participate in EC-patient activities, and when the EC nurses were not available to provide EC-related nursing care, doctors performed the nursing actions.

The nurses are required to use ward documentation for boarders, meaning various types of documents must be kept that are specific to patient condition and ward protocol. Furthermore, they are expected to manage the boarders according to predetermined ward routines, e.g. medication rounds, pressure-care protocols, feeding, taking routine vital signs and other types of nursing care that may differ according to patient diagnosis. This becomes complicated as the EC hosts a mix of surgical, medical and psychiatric patients, all of whom are functionally separated in the wards. This excludes the core undifferentiated EC patient, who has different needs and requires a separate skill set.

5.3.4.1 Other observations regarding patient arrival and disposal

When patients are incorrectly referred or arrive at the wrong facility on their own accord, an interruption is created for the EC doctor; he or she must deal with the patient and their referral notes. Another type of interruption includes the various nursing rituals and rules that delay patient disposal, e.g. the administration of first doses of ward medication or the collection of medication for the wards. Figure 15, a photo was taken in one of the ECs, demonstrates a nursing rule that delays patient disposal in which all linen is changed when the patient arrives in the ward and the 'EC's linen' is returned.

Figure 15: How nursing 'rules' delay patient disposal



5.3.5 Physical structure

All ECs in the Western Cape should be purpose-designed and built (208). The physical layout determines the operational requirements e.g. resource allocation to cover all areas. Generally, ECs are designed to allow maximum flow and to briefly accommodate a broad range of patient populations (Section 3.3, page 50). EC1 and EC3 have various patient-holding areas, including dedicated paediatric areas equipped with diagnostic tools, appropriate consumables and cots. EC2 has three areas: a main treatment area where paediatric and adult patients are seen, a resuscitation area and an overnight ward.

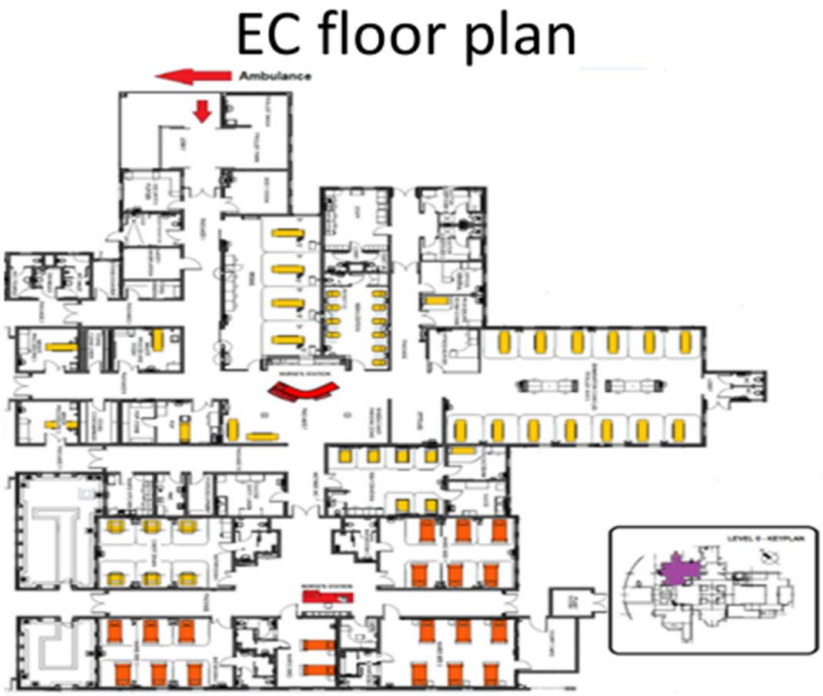
Participants mentioned in their interviews that the additional patient-holding areas create operational difficulties e.g. more staff are required to man them, and they hinder overall visibility. To allow quick reconfiguration, the relevant ECs have been furnished with mobile equipment; much time was spent searching for this equipment under the observer's watch.

The EC reception, waiting room and patient registration are separated from the main ECs via access-controlled gates. The triage area is located close to these gates and is only frequented by the triage nurse. He or she is, per provincial guidelines (139), a lower-category nurse, which may create liability during congested times because lower-category nurses – through no fault of their own – may miss important clinical and operational cues.

Key observations of the physical layouts of the newer ECs include:

- Visibility is limited and may influence the staffing levels required;
- Visibility was mentioned as being problematic during the informal interviews;
- Triage areas are geographically separated from the main EC;
- Separate doctor and nurse work areas were observed e.g. doctor's desk in the middle of the main EC, while the nurse desk is placed in the corner of or outside the main EC. In one EC, the nursing desk was referred to as 'the island' due to its distance from the patient care areas; and
- Equipment is mobile and allows for easy configurations.

Figure 16: Floor plan of one of the ECs



The floorplans for each EC were requested from the technical unit. In the floor plan in Figure 16, it is noticeable that there are various rooms and areas. The ambulance entrance is visible at the top of the map. The ambulance entrance is accessed-controlled and guarded by security. Following the ambulance entrance, the first patient area on the right, with yellow beds are the resuscitation area where critically ill (triaged red) patients go. It is required that there is always doctors and nurses allocated to work in this area. Going back to the passage and down the aisle, the red banana-shaped desk is the nurses working desk. Here, the policy, procedure, allocation and other nursing information are kept. Note, that from the nursing desk, it is not possible to see any of the patient areas.

To increase capacity, the EC team place patients in the area around the nursing desk. The concern is that there are no additional electrical plug points, oxygen points or nurse call systems in place in the area. Placing trolleys and chairs in this space blocks the passage and the ability to push trolleys for e.g. a deteriorating patient from the majors area to the resuscitation area is hindered. It is not possible to maintain patient privacy and this area is often used as a thoroughfare into the other areas of the EC.

At the edge of the right-hand corner of the nursing desk is the entrance into the paediatric patient area. And opposite the entrance to the paediatric patient area is a room that is utilised as a lock-down area for violent psychiatric patients. All the furniture has been

removed from this room as the patients use any item that they can find as a weapon to assault other patients, staff and security. There is 24/7 security at the door of the psychiatric room. On this morning, there were 32 psychiatric patients in the room.

The yellow beds in the room on the right side of the map are the majors area. There are 13 dedicated and numbered bays for beds in the majors area. On this morning there were 25 patients in the area, making it hard to use the numbered bed system. To manage this, the staff placed a patient sticker on the linen of the bed to identify the patient. In the middle of this area is the doctors' working desk.

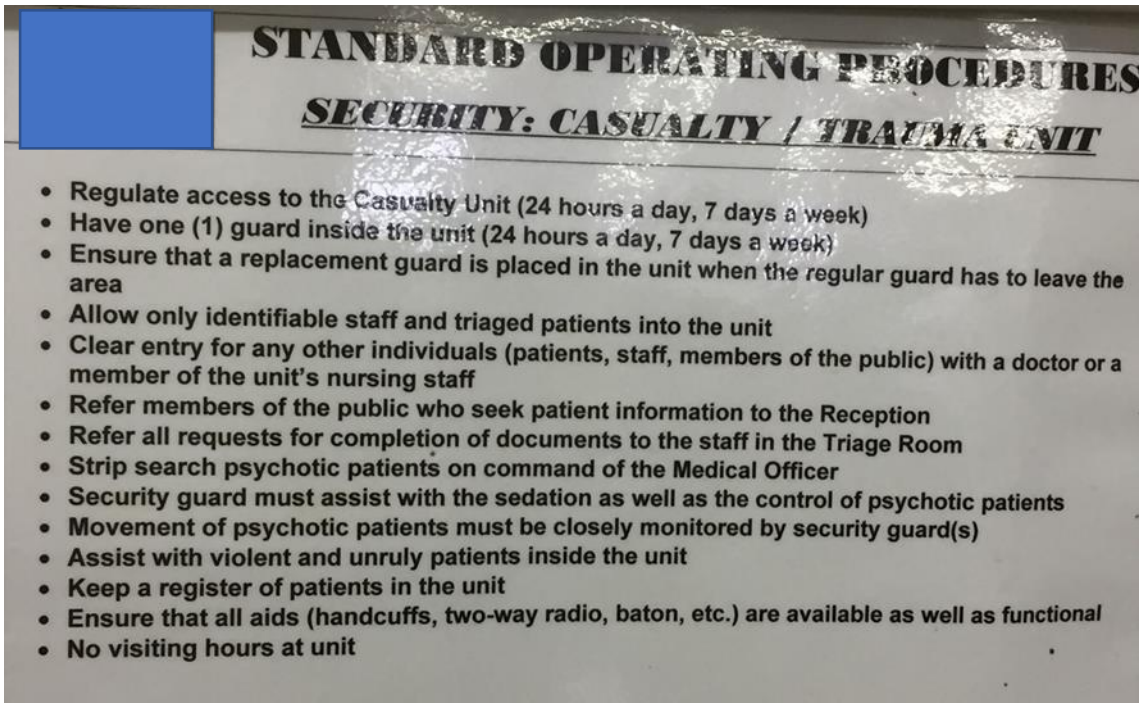
The orange beds at the bottom of the figure are the holding area where patients are kept that have been admitted to the hospital but do not yet have beds. This EC admitted 38% of all patient presentations for further care and investigation.

The inserted picture demonstrates the location of the EC (in purple) with the rest of the hospital. The other spaces contain procedure room, 4 storerooms, consultation rooms and a decontamination area.

Figure 17 shows the guidelines for security staff working inside of the EC. There are various indicators on this list that demonstrates that working in the EC is not a safe workspace. Examples on the list include the need for security inside of the unit, access control in and out of the unit, searching and stripping certain patient population, the mention of violent and unruly patients, and the need to have a baton and handcuffs inside of the EC.

None of the doctors or nurses carry weapons, and they rely on the security staff to protect them and keep them safe. Other hospital wards e.g. the medical ward does not require 24/7 security and access control. Specialised psychiatric units have security and access control.

Figure 17: Security access control to enter the EC



5.3.5.1 Increasing capacity in the EC

ECs are designed for quick reconfiguration and, according to interviewee estimates, they can increase their capacity to accommodate approximately three times the designed bed numbers. It was however observed that measures to increase capacity are not always safe, i.e. when trolleys are pushed into corridors there is less visibility, and it is difficult to push other trolleys past them. Patients that should be bed-bound get placed in chairs and patients needing invasive care, e.g. intra-venous infusions, get moved to the waiting areas.

Additionally, it was observed that staff members spent time searching for patients who had been moved since their previous interaction.

5.3.5.2 Ability to cater for long-stay patients/boarders

EC design does not lend itself to extended basic patient care. When patients who require basic care remain in an EC for several days, workarounds are required to meet their basic needs. Rendering hygienic care in a space not designed for it consumes the resources of EC staff. For example, patients in a ward can be assisted to bath or shower but, due to limited bath and shower facilities, are bed-washed with limited privacy in the EC.

Table 11: EC physical layout to fulfil basic boarder hygiene

	EC1	EC2	EC3
Patient toilet	4	2	2
Shower	2	0	0
Bath	1	0	0

Table 11 shows how limited the basic hygiene care facilities are, with two of the ECs not having the facility for self-hygiene. In EC3 the patients make use of the decontamination shower for self-hygiene. This is not the purpose of the decontamination shower facility and it is not conveniently located for oversight and assistance should it be required.

From a ward nursing perspective, patients that are on bedrest, i.e. restricted to a bed, requires bed-hygiene, changing position every 2-4 hours and linen changes when needed. Patients that are mobile require at least a daily wash, while patients that are semi-mobile require assistance to wash at their bedsides. Patients that are boarding in the EC have the same needs for basic hygiene, yet there are no showers or baths. Furthermore, the ability to render adequate privacy should they receive bed-hygiene are limited due to 2-3 patients occupying the same bed bay. Rendering basic hygiene to 20+ patients either takes an extra-ordinary amount of nursing time, or basic hygiene is being not rendered adequately.

5.3.6 Team and staffing

5.3.6.1. Types of EC staff

A full range of job descriptions was received from participants, but it was difficult to draw meaningful conclusions or compare job descriptions against EC strategic objectives. This was because of the following findings:

- Job descriptions were generic and had not been aligned with EC-specific strategies, visions and missions (Appendix 7, page 232);
- Equivalent discipline categories were not aligned e.g. a performance indicator for the emergency physician included managing patients according to a protocol, while other category doctors were measured on analysis of the complication rate;
- Only the professional nurse's job description mentioned the management of resources, which was not further specified; and
- Vital EC functions, e.g. triage and bed-flow management (which are mandated in the provincial guidelines and allocated on a daily basis) (139, 207), were not included in job descriptions.

After sending a staff list to the consultant at EC3 to confirm staffing levels, the consultant replied:

> '*That list is not very accurate – and misleading. Often, because of various reasons, staff from other departments are in employed in "EC" posts and vice versa – this is often done after a resignation where there is no immediate substitution – often posts are freezed [sic] if an immediate substitution is not available. So, out of desperation, staff from other departments are employed just to "fill" the post. HR's list is a list of the post numbers allocated at the beginning of (hospital name)'s commissioning and the doctors employed on it. Many of them are from other departments*.' - consultant email communication dated 02 November 2017.

The staffing levels employed in Table 12 were disclosed by the relevant EC managers, but could not be verified against the Human Resource department records. Human Resources disclosed the practice of filling vacant positions in one unit, but then moving staff to another unit. This practice makes it difficult to establish whether staffing resources had been adjusted to meet an increase in patients per annum, or to determine staff attrition and turnover rates.

Table 12: Breakdown of EC staffing levels

Comparison between the total number of nurses and doctors

Category staff	EC1	EC2	EC3
Total doctors (all categories)	**10**	**15**	**13**
Consultants	2	2	4
Medical officers	7	8	9
EM registrars (on rotation)	0	3	0
Community service/interns	1	2	0
Total nurses (all categories)	**45**	**23**	**44**
Operations manager	2	1	1
Professional nurses	17	11	16
Enrolled nurses	5	4	11
Enrolled nurse auxiliaries	21	7	16
Total patients 2016/2017	**2 687**	**3 500**	**3 750**

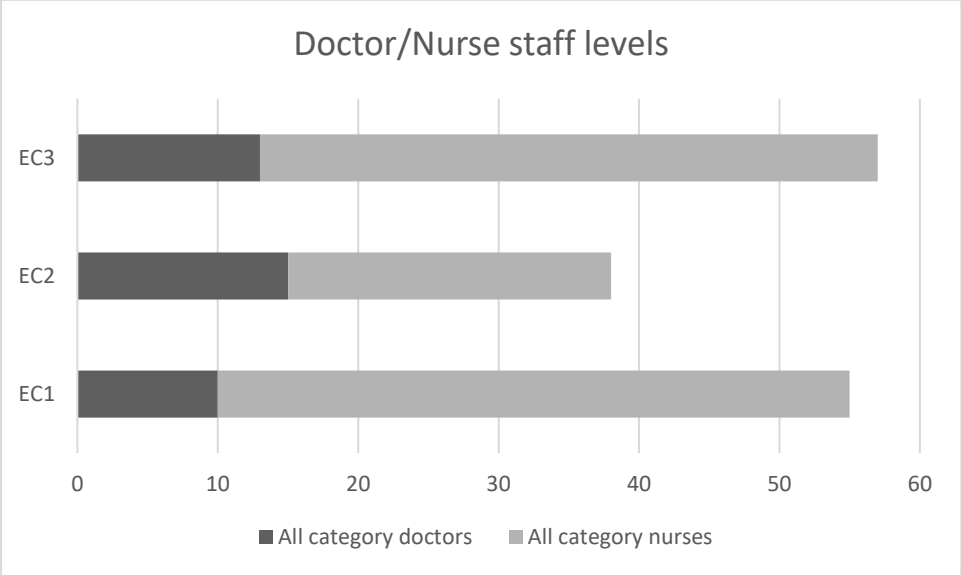
In all the ECs there were more nurses on the staff than doctors (Figure 18) but, because there is no prescribed doctor/nurse ratio, it is difficult to say whether this situation is normal or not. It seems to be generally accepted that more nurses than doctors will be on duty at any given time. Additionally, nurse levels are predetermined by the number of beds in an EC,

which does not relate to patient acuity, times of increased EC capacity or additional demands, e.g. placed by boarders.

The doctor levels are based on the patient intensity and the doctor staff levels across the ECs were similar, while nurse levels fluctuated considerably (Figure 18). In total, the units had approximately 2.6 nurses to a doctor.

Figure 18: Doctor/nurse staffing levels

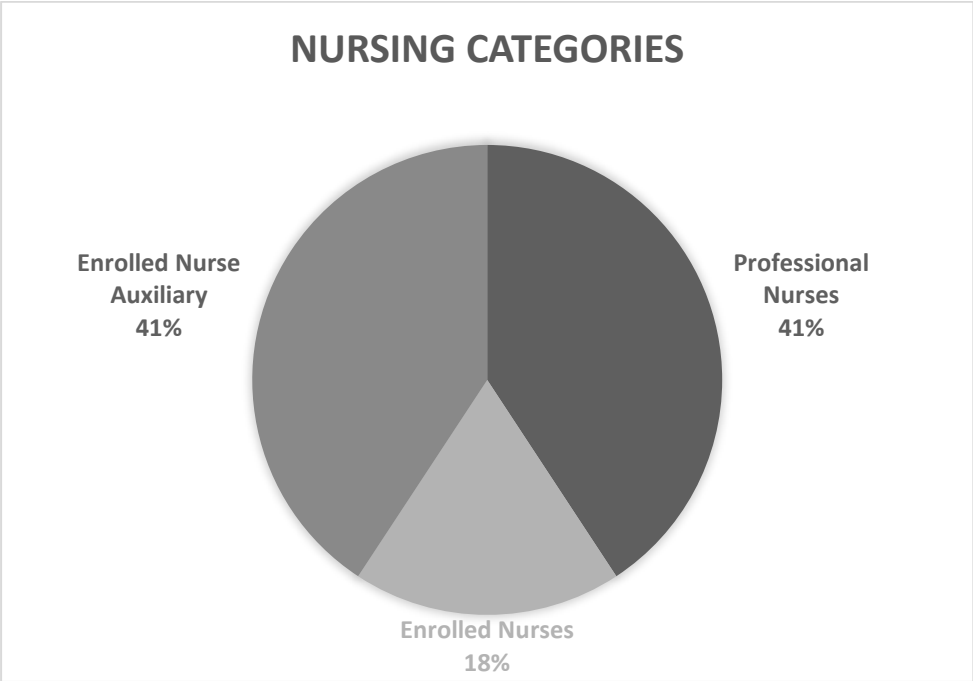
Shown in numbers



As seen in Figure 19, Professional Nurses account for 41% of the total nursing category. Nurses with specialist training, e.g. Critical Care or Clinical Nurse Practitioners form part of this 41%, which implies a very low number of specialist nurses in the ECs.

It has been said that the number, competency and efficacy of the nurses determine the ability of a hospital ward to render quality care (156). Internationally, emergency nursing is recognised as a highly trained post-graduate professional nursing speciality, yet the staffing breakdown of these ECs that mostly operate at or beyond capacity shows that lower-category nurses (59%) form the bulk of the nursing staff-mix. This is problematic for several reasons. According to the South African Nursing Council (SANC), lower-category nurses i.e. enrolled nurse assistants, '*delivery elementary nursing care planned and initiated by a Professional Nurse and carried out under his/her direct or indirect supervision*.' Yet due to the physical layout, level of capacity and staff complement, this type of oversight does not seem feasible, and the lower-category nurses in these ECs may be practising outside the limits of their scope.

Figure 19: Nurse staffing levels across categories



5.3.6.2 Temporary staff

Both disciplines make use of agency staff, but it appears as if the nursing discipline relies more heavily on temporary staff. The choice and approval of temporary staff are centralised at the top of each hierarchy, allowing for limited operational input.

Temporary/agency nurses receive a brief orientation on the day of their shift.

5.3.6.3 Social spaces and interactions

In all the ECs studied, doctors and nurses appear to have different social spaces; in EC1 and EC2, the doctor's social space is positioned outside the EC. Based on informal interviews, it was found that the evident social separation is preferred by the disciplines and appears to be more driven by nurses than doctors.

Additional noticeboards for each discipline can be found in their tearooms. While nurses tend to have pre-allocated tea and lunchtimes, doctor breaks are generally less structured.

There are no orientation documents available to new doctors - they must immediately assume their new role. Nurses, on the other hand, have an induction period with documented orientation topics.

New and temporary doctors must, therefore, ask nurses for guidance on how things are typically done in the EC. The hospitals tend to have an induction programme for new

employees, which the nurses attend. No straight answer was forthcoming as to whether the doctors attend it.

5.3.6.4 Professional identity

After nursing handover in EC3, the nurses form a circle and, while holding hands, sing a prayer. They are often joined by security staff, administrative staff and porters, but no doctors or patients join in.

Uniforms are an important indicator of identity but, even though both disciplines are generally made up of permanent employees, different rules seem to apply. Nurses are required to wear uniforms with distinguishing devices, this identification format may influence how individuals identify with their profession, as well as how they work together (209).

It was noted that even though there are legislative frameworks (Figure 20) regarding uniforms in government facilities, the doctors appeared to be exempt from the legislation.

Figure 20: Policy framework for uniforms

6. LEGISLATIVE /POLICY FRAMEWORK

6.1	Code of conduct for the Public Servants
6.2	Departmental circular H134 (Dress code for employees)
6.3	IPC Policy and Guidelines 2015
6.4	Nursing Act, 2005 (Act no 33 of 2005)
6.5	Labour Relations Act, 1995 (Act 66 of 1995)
6.6	Public Service Regulation, 2001
6.7	Public Service Coordinating Bargaining Council (Resolution No. 3 of 1999)
6.8	South African Nursing Council regulations on distinguishing devices (Government Gazette Notice No. R. 1201 of 31 July 1970 as amended)

Often, doctors were found to wear scrubs, but not all of them wore name badges or distinguishing devices. This made it difficult to establish, at first glance, who the most senior doctor on duty was. Different nurse categories wear different distinguishing devices, as has been determined by the regulatory nursing body, i.e. the South African Nursing Council (SANC). The distinguishing devices are shown in Figure 21.

Figure 21: Nurse distinguishing devices

Professional nurse	Enrolled Nurse	Nurse Auxiliary
		
Maroon epaulette with council badge	White epaulette with maroon council badge	Brooch, no epaulette
4 year diploma or degree	2 year course	1 year course
Independent practice	Direct and indirect supervision	Supervised practice

EC doctors attend regular training sessions, with on-the-spot training occurring during handovers. None of these sessions are regularly attended by nurses and, if a nurse takes part in the doctor handovers, it is typically the nurse manager. Doctors mentioned that they do invite nurses, on occasion, and at times nurses do join the sessions. But no EC nurse training, or on-the-job training, was in evidence during the observation times. Furthermore, none of the ECs carried out interprofessional training sessions during observation.

5.3.7 Resources

5.3.7.1 Resource allocation during the busiest times

ECs are busier after hours and over weekends, coinciding with the times that the rest of the hospital is quieter and/or not fully operational. It appears that when the rest of the hospital is not fully operational, the EC is required to take on additional functions:

- EC professional nurses are required to manage, dispense and control the To Take Out (TTO) cupboard, when the pharmacy is closed;
- After-hours radiology patients require an EC nurse companion;
- EC doctors are required to respond, after hours, to emergencies and unstable patients when other specialists are not present;
- In one of the ECs, EC doctors are responsible for all patients over weekends, regardless of referral, as some specialities do not perform patient rounds on weekends; and
- Additional resources, e.g. consumables and schedule medications, cannot easily be accessed after hours or on weekends.

Appendix 8 (page 233) shows the September 2017 daily/hourly shift rosters for two ECs; shifts are static and predetermined, with little consideration being given to patient variability

or after-hours requirements. Doctors have staggered shifts and nurses work 12-hour shifts on a fixed rotation.

5.3.7.2 Stock and consumables

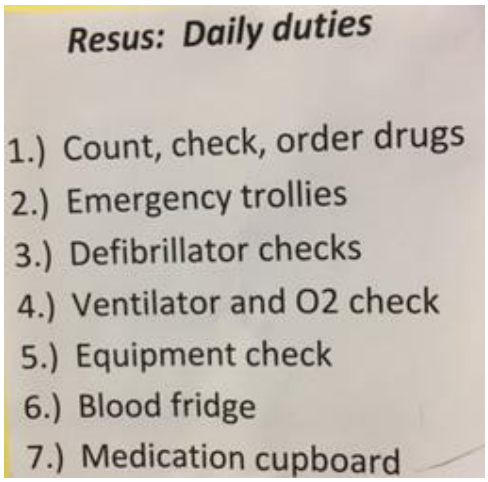
The operations manager at an EC is responsible for stock and budgetary control. It is a nursing responsibility to perform shift equipment checks, count scheduled medication, check all stocks and supplies for the day, establish linen needs and order patient meals. There are strict rules in place regarding stock and pharmaceutical requisitions, with no regard given for operational demands. In EC2, weekly stock requests must be placed before 08h00 on a Monday morning.

Should stock requirements exceed pre-set stock levels (e.g. major incident, outbreak, month-end weekend or seasonal variation), the request for these adjustments needs to follow the nursing chain of command, thereby requiring approval at every level in the chain prior to store manager approval. This central control of operational requirements tends to cause delays and shortages of stock, consumables and pharmaceuticals.

After supplies for the day have been rationalised, all ECs follow a similar system of locking internal store and linen rooms. Keys are held by the operations manager, even when he or she is out of the EC. This means that, at times, the keys are not available to nightshift staff.

There was no evidence in either policy or unit guidelines that any short of stock, broken equipment or shortages need to be communicated to anyone other than vertically within the chain of command i.e. if equipment is broken it is noted on a checklist and communicated to supervisor (shift leader or manager); with no requirement to inform peers, doctors or other potential users of the item.

Figure 22: Picture showing the daily duties of nurses in the resuscitation room



5.4 Synopsis of descriptive study findings

The purpose of this descriptive study was to describe the conditions and environment of the EC. The study demonstrates that doctors and nurses attend to the same patients simultaneously, within the same four walls, while accessing and vying for the same resources. Additionally, the two disciplines function as distinctly separate silos, with restricted and segregated operational functionality. The current EC operations are therefore dysfunctional, with severe barriers being observed to collective sense-making and the ability to respond to daily challenges:

- Doctor and nurse operational responsibilities tend to be fragmented and muddled. This fragmentation and division are supported throughout the entire hospital system, thereby hindering adaptive capabilities and sense-making throughout (Section 5.2, page 93 and Figure 8, page 94);
- The functional separation between the disciplines is strictly enforced from top management, in a typical bureaucratic hierarchy where basic design limits flexibility and horizontal communication (Section 5.2, page 93);
- Communication failures take place in numerous channels, guided by policies that are not freely accessible to those expected to follow them, and as a result of convoluted information flows (Section 5.3, page 96);
- Information moves in silos (Figure 8 and 9, page 94);
- Resource management limits adaptive capability. Limitations include staffing levels, stock, consumables and pharmaceuticals (Section 5.3.6, page 110 and Section 5.3.7, page 115);

- External in-hospital support is distorted, and during its busiest times the EC is expected to step up and support the hospital, instead of the hospital supporting the EC (Section 5.3.7, page 115); and
- Accountability is complicated, e.g. the EC consultant possesses the highest operational decision-making power. Yet, the operations manager is responsible for coordinating operations, but there is no indication in the formal structures of how this should be navigated.

5.5 Chapter conclusion

The purpose of this chapter was to describe the conditions, formal structures and physical design of the EC environment. Due to the design of the formal structures, doctors and nurses disjointedly respond to the same challenges, sometimes even vying for the same resources. Several organisational constraints hinder collective sense-making, collaboration and the ability to reach common ground between the two groups. This reduces the adaptive capability of the EC to respond adequately to daily challenges and continue reliable operations. The findings suggest that muddled operational responsibilities exist throughout the hospital system.

Chapter 6: SenseMaker® findings: the narratives

6.1 Introduction

The next two chapters deal with the data collection process and findings of the SenseMaker® study. The chapters follow the sequence of the survey – the survey starts with a prompt to tell a descriptive story - and as such the findings of the narratives are discussed in Chapter 6, with Chapter 7 covering the rest of the survey. The roll-out of the study and who participated is considered first, before turning to the narrative analysis.

The SenseMaker® survey was tested twice – first to ensure that the most appropriate signifiers were selected, that it was clear, not too lengthy and that there was a good spread of answers to the signifiers. The pilot data were not analysed. Secondly, once the survey was loaded onto the website, it was tested for technical considerations.

The plan was to distribute the web-based SenseMaker® instrument via an email link to all potential participants, but the response rate was low, mail-lists were incomplete and the nursing staff, especially, had little email or web access. Thus, I reverted to the contingency plan of using a mix of email links and paper surveys; data collection was extended from the planned eight weeks to 18 weeks.

A total of 89 stories was collected. The SenseMaker® tool allocated narrative identity numbers non-sequentially, which protected participant anonymity. Narrative analyses occurred after signifier analysis (Chapter 7), to reduce bias, and all narratives were read through twice before themes were identified.

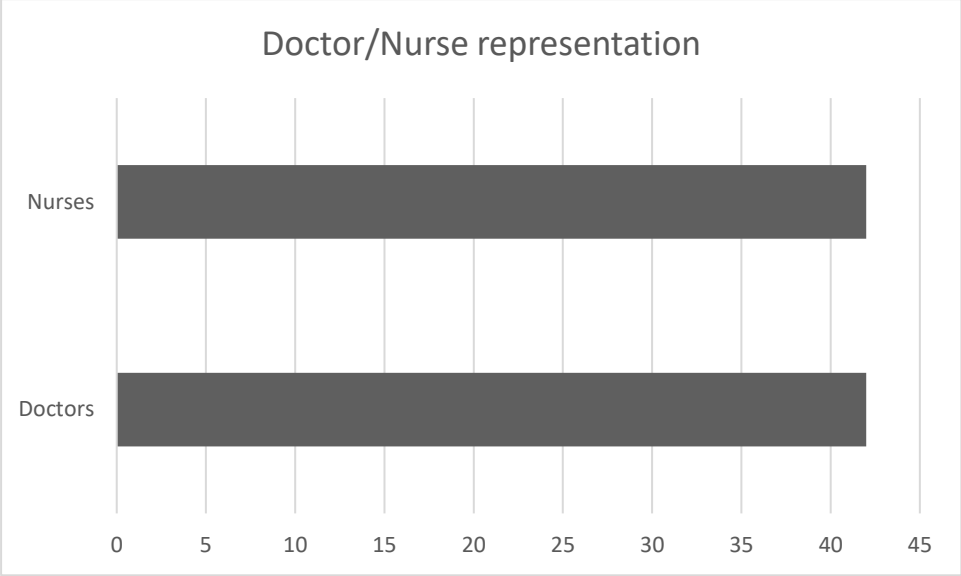
The narrative analysis was done by using data from the prompting question, title and metaphors of the SenseMaker® study. Doing a separate narrative analysis is not normally done with SenseMaker® studies, and the narrative analysis was done for two reasons: a secondary purpose of the study was to appraise the usefulness of the SenseMaker® tool in the EC context, and the additional narrative analysis informed the thick description strengthening the findings of the descriptive and SenseMaker® studies.

This chapter contributes to both study objectives, adding to the thick description (objective one) as well as objective two which is to explore how team members make sense of the demands in the EC. The answer to the prompting question and metaphors used to describe the EC is analysed to consider how sense-making differs between roles, the interactions between team members and the types of cues mentioned.

6.2 Participants

Doctors and nurses were equally represented (Figure 23), and all categories participated (Table 13). The participants had varying numbers of years of experience and levels of tenure in each specific EC (Figure 24).

Figure 23: Participant representation



Within the professional disciplines, the highest category doctors and nurses – emergency physicians and professional nurses - were the best represented (Table 13).

Table 13: Breakdown of participants within doctor and nurse categories

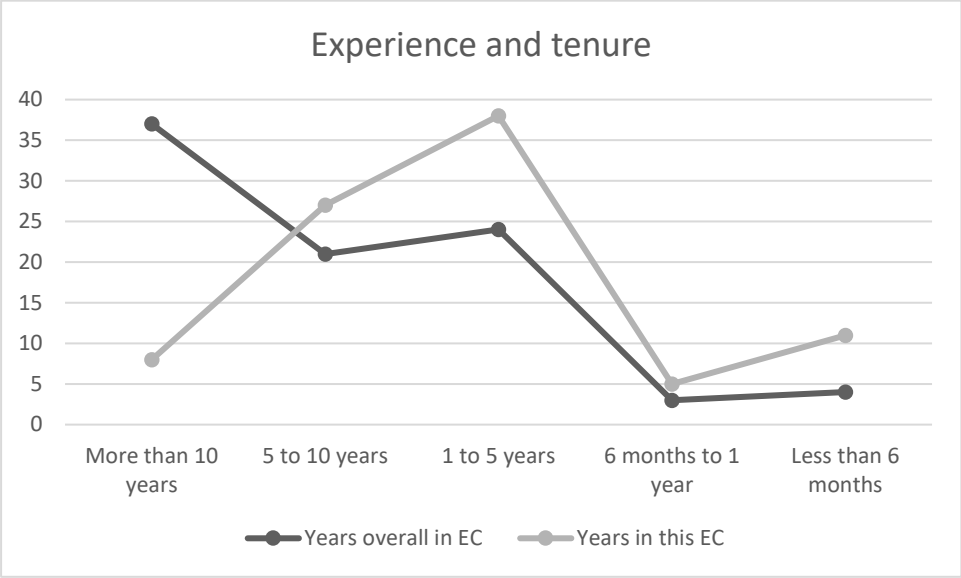
The NA (not applicable) option was used by paramedics that occasionally work shifts in the ECs.

Category of doctor or nurse	
Emergency Physician	24
Medical Officer	18
Professional Nurse	25
Enrolled Nurse	14
Nurse Assistant	3
Not applicable	5
Total	**89**

A distinction was made between years of experience in emergency care and tenure in the current EC. Most participants (41.5%) had more than 10 years' experience working in emergency care, whilst only 9% had been in the current EC for more than 10 years (Figure24).

Regarding tenure in current EC, most participants (42.6%) had been there for 1-5 years, whilst 18% had been in the current EC for less than a year. This implies regular turnover, with most participants having worked in other ECs or emergency care settings.

Figure 24: Years of experience and current tenure



6.3 Content of the stories

Participants were provided with a prompting question to tell a micro-narrative (47) (Box 4). The prompting question presented participants with an interruption, the nature of which they could choose and disclose. They were then asked to refer to the difference between normal and challenging situation and the team response. The rationale for the prompting question is discussed in Section 4.5.2.1 (page 78).

Box 4: The prompting question in the SenseMaker® survey

Whilst showing a new colleague around in the EC, you are interrupted to assist with a challenging situation. When you touch base with the colleague later, they ask how often these types of challenging situations arise and what they should do. Tell them a story that demonstrates the type of challenges that people in this EC deals with. Refer to the difference between normal and challenging situations and how the team responds.

The 89 narratives were analysed, along with their titles and metaphors, and were found to differ vastly in length – some were very long, others consisted of brief statements and still others were bulleted. Word selection and sentence patterns revealed that some understanding (i.e. sense-making) had been applied to each situation.

The stories suggested that interruption is an integral part of their days and many stories referred to interruptions as a constant presence. The main categories in the various stories were grouped together (Figure 25 and Table 14), with some stories revealing more than one theme which resulted in more categories (184 meaning units) than stories (89 stories).

A large proportion of stories (23 stories) was about clinical care and patient expectation. Some stories referred to the positive aspects of the team, whilst others spoke about dealing with conflict and negative team aspects.

Figure 25: Main story categories

Themes are shown in percentage of the total number of meaning units (184 units).

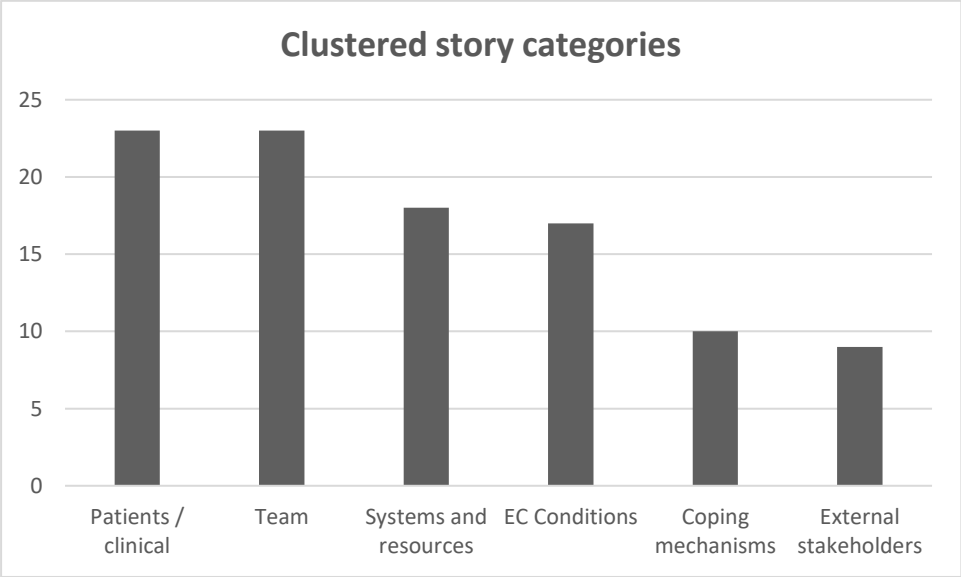


Table 14: Story themes and categories

Theme	Categories
Patients/clinical	Inconvenience and discomfort to patients Patient expectations Clinical cases (excluding psychiatric patients)
Team	Conflict between team members Teamwork Stories referencing the other discipline
Systems and resources	Staff shortages Resources Supply chain Budget constraints Bypassing other facilities e.g. primary healthcare, inappropriate referrals and poor hospital discharge planning
EC conditions	Crowding Flow issues

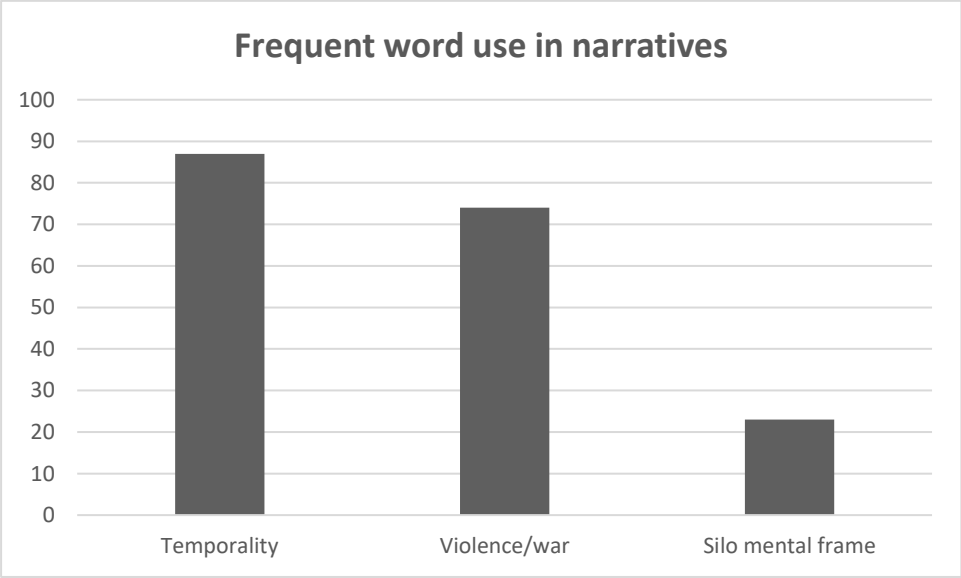
	Physical layout Impact of psychiatric patients
Coping mechanisms	As per elicitation question - a reference to advice and things to do/not to do when starting in the EC
External stakeholders	The rest of the hospital Hospital buy-in Other specialities

6.4 Categorisation and labelling of situations

In reference to the process of sense-making (Section 2.5.3, page 20), once people pick up on variation, they crudely categorise it based on a plausible story of what has happened before. Whilst reading through the narratives, I searched for the labels that participants attached, and the frequency of concepts was considered. The stories revealed three main categories (Figure 26) that were further disaggregated in this section.

Figure 26: How situations have been categorised

Shown in the percentage of the total number of meaning units (184 units).



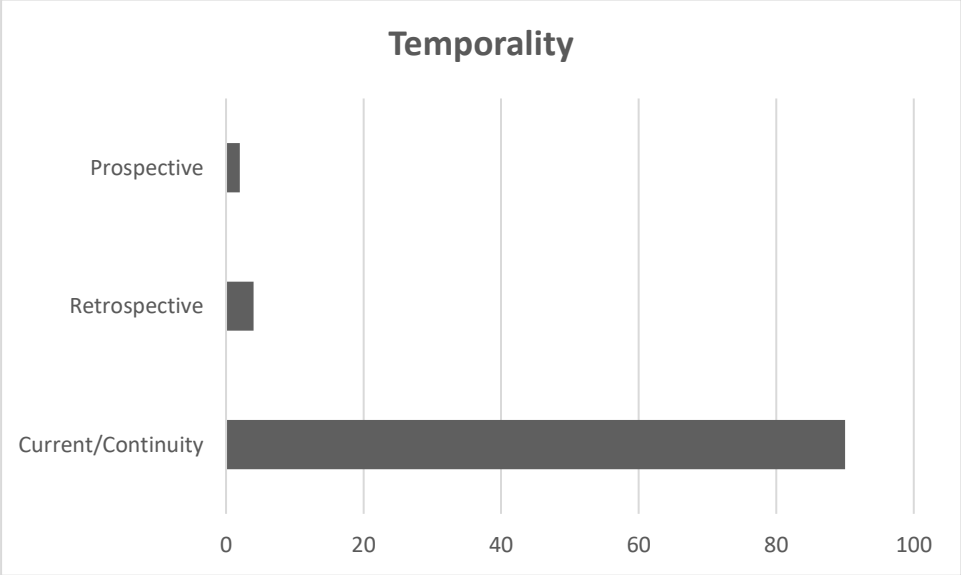
6.4.1. Temporality

Time was mentioned in various ways in 77 of the 89 stories, with the EC staff showing a high awareness of time/time pressures. The term 'temporality' was used to group these stories. Temporality is used here as a sense-making principle; it refers to the process of cultural time construction, with temporal reference points engaging past, present and future.

References to time were predominant to the current situation or else referred to the continuity of events, rather than being situated in the past or future (Figure 27). People are consumed with the present. The potential exists that this will lead to now-only actions and reactions (i.e. focusing on the current situation and the continuity of events), without people considering future events or reoccurrences. This approach means problems are only solved by 'applying Band-Aids', as opposed to the underlying reasons being tackled.

Figure 27: Temporality

Shown in the percentage of stories mentioned in (89 stories).



These stories included words such as:

Continuity: *always, constant, every few minutes, all the time, never-ending, endless tempo*.
Current time*: at this time, at this moment, currently, today, all-in-a-day/all-in-one-day*.
Reference to patient length of stay and waiting times: *for two to three days, for hours*.
Prospective: *looking forward to the next day, future-term plans*.
Retrospective: only two stories used terms such as *'traditionally'* and *'worked here so long'*.

6.4.2 Silo mentality

A number of stories focused on the storyteller doing things they did not consider part of their job description e.g. the clerk was not there, there was no security, couldn't find a nurse so did the nurse's job, etc.

There was also a degree of dissociation in some of the stories, with storytellers referring to 'they' and 'them' without clarifying who they were talking about. Using dissociation, they

succeeded in disconnecting themselves from the situation at hand, and emotionally distancing themselves from others. As soon as people think and speak about 'us-versus-them' they are engaged in building an identity boundary, where they trust other insiders in their 'identity group', taking for granted the perspective of their group whilst potentially disregarding the perspectives of other groups or teams. As seen in the narrative below, 'they' refer to the other wards in the hospital that can refuse accepting patients for admission when the wards are at capacity.

> *'**They** can't put a patient in the waiting room because they'll face the toilet, but in the EC, they are literally on the floor in front of the toilet and that's ok' (Narrative 66)*

The next narrative demonstrates the difficulties of navigation between managing patients and discipline-specific policies. It is a nursing guideline that if a patient is receiving opioids or any medication that may alter the level of consciousness, the patient must be cared for in a bed. It is problematic to follow the guidelines in the EC, as some patients requiring pain medication may be in a chair when there are no beds available. Below, a doctor shares the frustration in trying to manage a patient in a chair and their prescription clashing with the nursing policies, *you can't* refer to the nurses.

> ***'They** can't nurse a patient that had morphine in a chair, the patient must be in a trolley. So, what do you do? Manage the pain or ignore the pain? You can't tell me not to write it up. How about I write it up and you tell me that you refuse to give it and write it in your chart?' (Narrative 68)*

In the next narrative, the nurse wrongly assumes that the doctors have decision-making power and choice to refuse patients. But, to implement the case load policy and revert patients is a centralised decision made outside of the EC (207) (Section 5.3.3, page 103).

> *'The doctors must think before **they** accept patients' (Narrative 81)*

6.4.3 Hostility

War and war-like terms were mentioned in roughly half (45 of 89) of the stories, with a further 21 stories mentioning aggressive behaviour e.g. verbal abuse, feeling bullied, being spat at, physical attack and people shouting at each other. These stories often used war-like titles; in addition, 8 stories had war-like titles without any war-like terms within the story. The 8 war-like titles were grouped here as well.

In total, 74 stories referred to war, verbal abuse and hostility. In Tables 15 and 16, the war-related words and metaphors used are distinguished from 'hostile' words and metaphors used.

Table 15: War-related themes

Shows the actual words used in the narratives, titles and metaphors.

Metaphors referring to a war	**References to war in stories**
War zone (more than once)	Defusing problems
Fighting a constant battle	Take on the threats as they arrive
Like going to war	Protecting turf/territorial
Juggling a collection of weapons whilst blindfolded	Being under attack (visitors, community, hospital management)
Soldier in a war zone	Hotspot
Special forces military operations	High risk, short fuse
Flying a fighter plane	Throwing a grenade

Table 16: Hostile work environment

Shows the actual words used in the narratives, titles and metaphors.

References to hostility	
Shouted at	Bullied
Attacked by	Spat at
Punched by	Endure profanities
Shouting at each other	Threatened by
Insulted by	Discriminated by

Looking at the three categories, it becomes apparent that the people in the EC are consumed in a war. Their use of war metaphors in their everyday conversations determines how they view their situation, i.e. how collaborative they are and how they experience their work setting (61) (Section 2.9, page 38). While at this point it is unclear who the war is against, the silo category might suggest that the enemy is anyone not forming part of the group to whom the storyteller belongs.

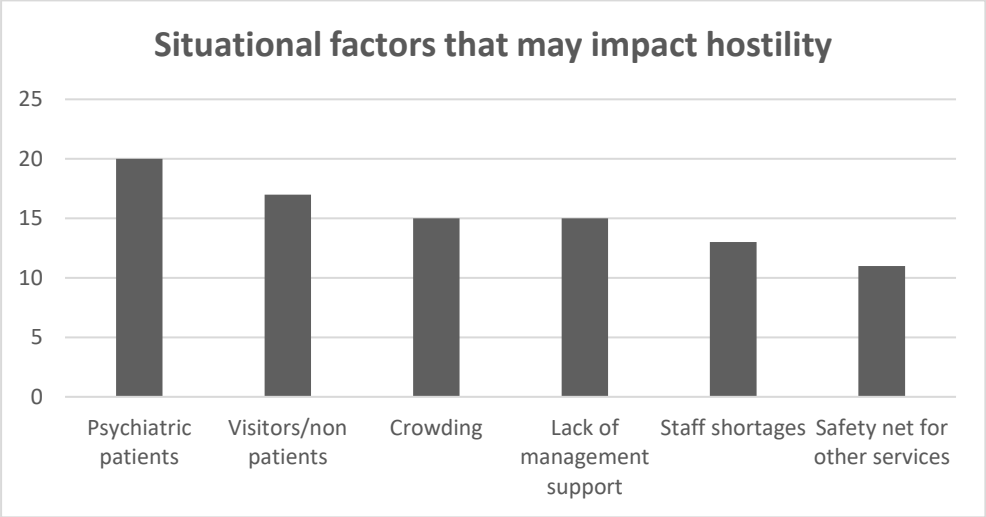
6.4.3.1 Situational factors that impact on the plausible categorisation of events

To identify the enemy, the situations described by the storytellers were analysed. It didn't help to try to identify one enemy; there appeared to be numerous factors leading to EC hostility. Furthermore, the situational factors were all external (Figure 28), which EC staff could not control. Externalisation is a type of mental framework that is likely to lead to feelings of aggression and helplessness and, because of this, people may feel that they

cannot adequately address the issues they grapple with each day, thereby leading to higher levels of frustration than necessary and the need to blame others.

Figure 28: Situational factors impacting on categorisation

Percentage of situational factors mentioned in meaning units. Some stories mentioned more than one situational factor.



Each of these factors is briefly mentioned with an example of a narrative told about the situational factor.

Psychiatric patients: The psychiatric patient population was most often mentioned as the cause of interruptions or challenges and were often described as violent and disruptive. Psychiatric patients often require the involvement of the whole EC team, and according to this storyteller, it has an impact on the operations of the EC, delaying routine tasks and patient care.

> *'When psychiatric patients come into the EC severely psychotic and aggressive. We need security (2-3) of them, a medical officer, sometimes the consultant and registered nurses have to jump in when the patient does not cooperate. Security have to hold the patient down while the doctor tries to get up an IV line and the registered nurses get sedation and flush (sterile water). One of the nurses have to get a trolley for the patient to lay on before drawing blood and sedating the patient. Therefore, the whole team is needed for a while to sort out a challenging situation like this. We get this daily. And patients (others in EC) are not always happy by this' (Narrative 50)*

The story below refers to the length of stay of these patients and considers that the EC is not designed to care for this patient population.

'We often have disruptive and violent or aggressive psychiatric patients here for days, sometimes weeks. When the beds run out, these patients are nursed on Lazy-Boy chairs. Combined with the physically cramped space, this arrangement puts the staff at risk, and it undignified for the patients' (Narrative 9)

Visitors/non-patients: Visitors and/or non-patients, including relatives and community members, were frequently mentioned as being challenging to deal with and causing unwarranted interruptions (Table 17). These often had to do with waiting times.

Table 17: Dealing with visitors, family members and community members

Shows the actual words used in the narratives, titles and metaphors.

Stories about	Referring to
Threatened by the community A community that is threatening	Community
Abuse from family members Rude and disrespectful family members Difficult family members Angry family members Parents interrupted	Family member/family members in general (without mentioning patient)
Unreasonable demands from patients and relatives; rude and abusive Long waiting times cause family members and patients to panic	Patient and family member/relative
Insulting Shouting	They (non-specified)

Crowding: The term crowding/overcrowding was used in 12 of the stories, a term that was categorised separately from mentions of 'flow' or the EC being 'full.' The following stories are indicative of the level of crowding in the ECs e.g. accommodating 90 patients into a space designed for 22 patients.

'The unit is designed for 22 patients, but runs 70 to 90 patients a day with no adjustment [in] resources' (Narrative 71)

'We are pushing our resourcefulness increase in patient numbers of 8% and we've not received any additional resources' (Narrative 78)

'Unit was very full about 80 to 85 patients' (Narrative 88)

'The unit is so full today we've got 88 patients overall' (Narrative 86)

'Sometimes in resus we have 23 patients and we resus on the floor. We have 12 chairs with 45 patients; they don't divert or send extra staff' (Narrative 87)

Lack of support: A lack of support was generally experienced from management, hospital management and 'the system'. This links back to feelings of externalisation, where staff members feel unsupported and unable to respond to daily operational challenges and/or resolve underlying systemic issues. The risk of operational failure is increased if the ongoing safety crisis experienced by the ECs' operational team are ignored or unacknowledged by hospital management (Section 2.8, page 32).

Table 18: Lack of support

Shows the actual words used in the narratives, titles and metaphors.

Stories about
The rest of the hospital/other specialities
*(*Actions from the rest of hospital*) … which leave the burden on the EC team*
We need a hospital-wide strategy, but they won't compromise to help us
The other specialities take refuge in their wards
*Our biggest issue here is … (*lack*) of support from other consultants e.g. internal medicine*
Beware of territoriality between the specialities; everyone is guarding their territory
… with no help from the other wards
Hospital management/executives
Hospital executive is not driving patient movement in the hospital, which should take place from the top down
Some managers have no aptitude in getting things done
The CEO was contacted but refused to come down and defuse the situation
Management, with their budgetary constraints and lack of support on the ground
Management never does rounds here, they say we are coping. How can they be sure of this if they don't attend rounds?
The system
EC crowding is a manifestation of a hospital problem and a system problem. *The wards are filled to 100% capacity and then they refuse more patients, but the EC is never allowed to refuse any patients.*
We cannot say no to patients, but it seems our system can say no to us when we need help
Inequity of our care … abandoned by the system which is supposed to support us

Staff shortages: Stories by both doctors and nurses referred to staff shortages, but these were more likely to pertain to nursing shortages and both disciplines seem to find the nursing shortages more critical.

'My biggest issue is the toll that the boarding patients have on the EC nursing staff. They require cleaning, regular medication and observation. This renders the EC staff unavailable

to perform their core duties which is triage and management of the acutely unwell patient. Because they have to do regular medication and observation rounds for the admitted patients, they end up delaying triage for the newly arrived EC patients. We know that triage saves lives and delayed triage means that staff may be unaware of how ill a patient is for an extended time after they arrive in the EC' (Narrative 18)

Safety net: A role the EC is forced into, i.e. acting as a safety net and looking after primary healthcare patients, ward patients, psychiatric patients and more, was often mentioned in participant stories.

Examples of how the EC becomes a safety net for the other services:

Primary health care system

'*There are a lot who come to the hospital EC with the hopes of some kind of short cut avoiding the clinic or getting quicker access to services that others have already been waiting for months' (Narrative 20)*

The rest of the hospital

'*We have hospital issues that manifest in the EC, it is not actually an EC issue, but the hospital has made it into a pure EC issue – the boarders' (Narrative 66)*

Psychiatric care system

'*They won't accept patients and they stay up here to 15 days. Risks with them include that they are psychotic, so we sedate them else they take so much nursing time they don't get adequate care here' (Narrative 76)*

6.5 Mental frameworks

Cognitive or mental frameworks constrain or enable responsiveness and sense-making. Critical thought processes that get interrupted were mentioned as a concern – or factor leading to mistakes – in seven of the stories; e.g. narrative number 18 refers to interruptions that lead to distracted critical thought processes in a high-density decision-making environment, and narrative number 37 refers to mistakes creeping in when a staff member is interrupted.

There is a link between emotional tone and mental framework. The human pre-frontal cortex is responsible for the highest order cognitive abilities, generating a 'working memory' or framework of past situations. Because the pre-frontal cortex is highly sensitive to stress

exposure and when a person experiences strong emotions (strongly positive or strongly negative), responses from the pre-frontal cortex can be rapidly impaired (49).

Feelings were mentioned in 21 of the stories, e.g. '*I feel like a hero'*, '*I feel sad'*, '[my] *biggest fear*', '*pressure is crushing us*', '*I became calm'*, '*always happy*', and so on.

It was noted in the SenseMaker® survey that an even distribution of positive and negative stories was evident. In the narrative analysis, adjectives were frequently used to express emotions, e.g. always happy, feeling crushed, shaken staff. Some of the stories that rated positively in the SenseMaker® survey, did not actually come across as being overly positive in the story. This may refer to a victim/martyr complex, where for example being verbally abused is generally accepted as part of the profession and is thus not perceived as abnormal.

It was argued in the literature review (Section 2.5.4, page 21 and Section 2.8.3, page 36) that people may be blinded to how their actions impact on others, which also plays a role in situational awareness. This might be contained within a group or professional identity; the stories were checked to see if and how doctors and nurses mention the other professional group.

Nurses were mentioned in 19 of the 34 stories that self-identified as doctors; these stories typically focused on the nurses' plight e.g. nurses being the most vulnerable people in the system. Nurses, on the other hand, were less likely to mention doctors – in fact, they only referred to them in 10 of 34 self-identified nurse stories.

Doctors seem to be more aware of the challenges that nurses face than nurses are of doctors; in fact, nurses seem unaware, as reflected in their stories, of the challenges doctors face. If doctors are mentioned in their stories, it tends to be more in reference to what they should be doing or how nurses are following doctors' orders.

Figure 29: Doctor and nurse mention each other in stories

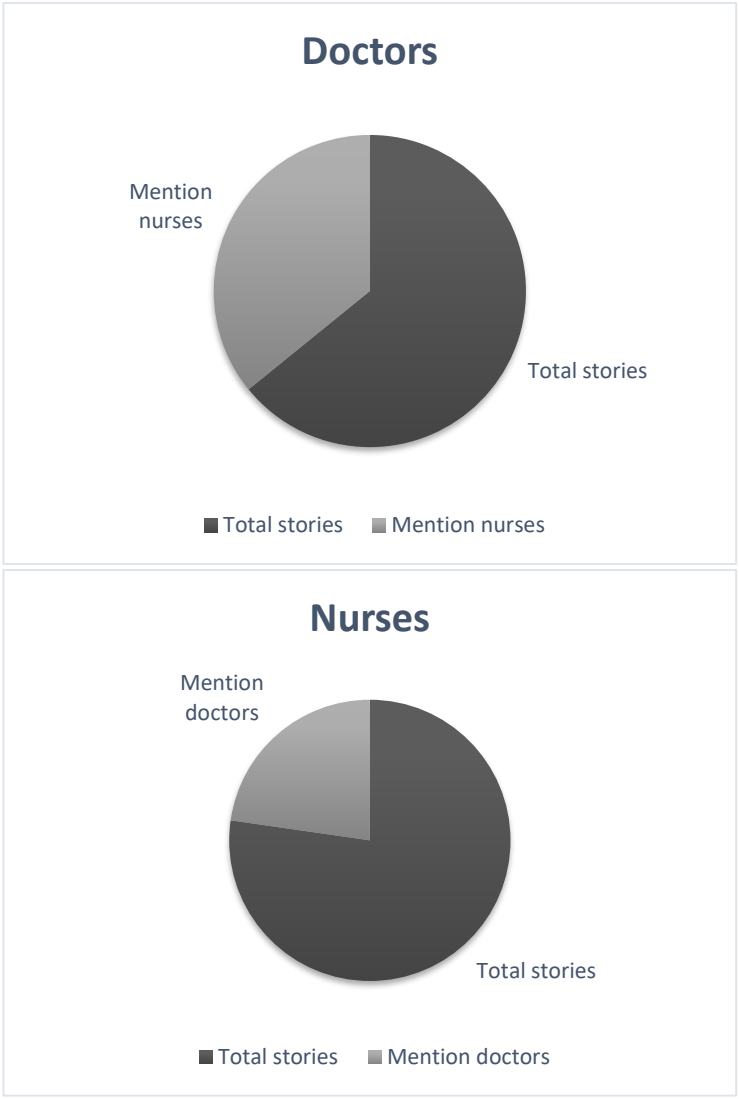


Table 19 shows how the doctors regard the EC nurses, and it was grouped according to the nursing plight, how to behave towards the nurses, collaboration, and the absence of nurses at critical times.

Table 19: Doctor stories that mention EC nurses

Shows the actual words used in the narratives, titles and metaphors.

Doctors stories that mentioned nurses mentioned…
Nursing plight
Nurses are the most vulnerable people in the hospital system
Nurses gets the hardest and most impossible workload
Nurses do not feel empowered to deal with certain patients and complaints
Behaviour towards nurses
It is important to make the nurses feel safe
Always be nice to their nursing staff, their value cannot be overstated, and your productivity and sanity can be extinguished quickly if you fall out of their favour
Get the nurses on your side; if the nurses are worried, pay attention. They are the ears and eyes at the back of your head
Doctor/nurse collaboration
The role of doctors/nurses has merged
New doctors are told to rely on nurses for guidance
Good things that happen are due to the goodwill between doctors, nurses and security. But you cannot just take; there is a limit to goodwill
Absence/ presence of nurses in the story told
Senior nurse was busy elsewhere; agency nurse did not know where the drugs were
You cannot find the nurses to help, so you do stuff yourself
Professional nurse in resuscitation room did not have good insight into the seriousness of the situation

When nurses mentioned doctors, it was most likely to concern clinical matters, following doctors' orders, or opinions on doctors' duties. This is shown in Figure 30.

Figure 30: Nurse stories about doctors

Collaboration: following doctor orders, showing the doctor clinical data.

Doctor duties: *doctors must think before just accepting patients*, *tell the doctors* to move patients, doctors must send psychiatric patients to the relevant ward.

Poor teamwork: *the doctor was shouting at us*; *the doctor would not listen to us* and *we felt undermined.*

The nurses showed signs of externalisation in their stories, in which they at times came across as passive-aggressive. Their stories contained opinions of how the doctors should do their jobs and blamed them for various things, e.g. accepting psychiatric patients into the EC.

Two things stood out from the doctors' stories: they seemed protective of the nurses, i.e. saw them as vulnerable, exposed and disempowered. In their stories, the doctors were also more likely to provide details of what the nurses were doing, their challenges, and so on; they appeared more situationally aware of the nurses than the nurses were of them.

6.6 Communication between EC team members

The stories were searched to find how and if the storytellers referred to communicating with others i.e. proof of communication. When methods of communication were mentioned, they mostly referred to formal and procedural communication. The use of command words i.e. task or instructional words was found in both the doctor and nurse stories. This is shown in Table 20; note that communication with patients or relatives is excluded from this table.

Table 20: Words and phrases used to describe communication

Shows the actual words used in the narratives, titles and metaphors.

Words used in the story to describe communication with colleagues
You cannot tell me not to write it up; how about I write it up and you refuse to give it?
You must tell the doctors to decide
Just ask the nurses
You must call the nurse shift leader to explain
Appropriately, the nurses refer the situation to the senior doctor working that day
The nurses refer all complaints to us
I fled to shout for help
The nurses do not protect or speak up for us
Our consultant is informed and provides advice
The nurses do not ask for the doctor's input or consideration
Double-check things with the doctor
My manager checked if I'm okay
The EC staff only debrief with each other; they will not ask for help or counselling
The doctor was shouting at us
The doctor did not want to listen
As a team, we identify

6.7 Consuming nature of the EC

The titles and metaphors were studied separately to find themes within the titles and/or metaphors used. Some titles and metaphors had a positive or negative connotation, this is shown in the first two columns in Table 21. Often, the title or metaphor referred to the consuming nature of the EC, and this is shown in the third column in Table 21.

Table 21: Grouped titles and metaphors

Shows the actual words used in the narratives, titles and metaphors.

Postive titles and metaphors	**Negative titles and metaphors**	**Consuming: working in the EC is like**
Enjoyable and overwhelming	Marikana Mondays	Going to war
Each day is a surprise	Constant battle	Flying a fighter plane
Phenomenal	A warzone	A soldier in a warzone
The place of miracles	Alone	Special forces military operations
Great, when it's the dreamteam	A circus	juggling a collection of soft toys and dangerous weapons while being blindfolded
Magic	Sad	Being raped whilst your parents are watching
Motivating	Being abused, abandoned and betrayed	A consuming job, funny, sad and addictive
Consistent learning environment	Choking	Trying to pat your head and rub your stomach at the same time
We are family	EC warzone	A rollercoaster ride
Strongly exciting	Chaos specialists	Playing 20 speed chess game at once
Life saving	Management of chaos	Waitress in a busy restaurant
Like spring (the season)	Pulled in all directions	Being the captain of a sinking ship

To further explore the consuming nature of the EC, the attention was turned to how the storytellers described a day in the EC, and what advice they gave to the new person as per the prompting question (Box 4, page 121).

Table 22 provides descriptions of the normal conditions in the EC. They described the environment as crowded, noisy, with sick patients on chairs and on the floor. Interruption is normal and takes various forms e.g. operational or clinical issues, and decision-making is fragmented due to the interruptions. The storytellers stated that they felt physically unsafe due to community, certain patient population and risk of contracting diseases e.g. Tuberculosis. They mentioned being short-staffed and resource constrained.

Table 22: Descriptions of the EC environment

The 'stories mentioned' column shows the actual words used.

Category	**Stories mentioned**
General EC environment	*Crowding;* *Never quiet or dark;* *No privacy for patients.*
Sick patients in 'wrong' spaces	*Sitting on hard plastic chairs for hours or days;* *On the floor in front of the toilets;* *On NATO stretchers;* *…it's Tuberculosis and then they have to stay here between the other patients;* *[No beds in resus so] we resus on the floor.*
Interrupt driven (interruption is the norm)	*Constant interruptions interfere with tasks; Distracted critical thought processes;* *Whether it is an item, telephone call, complaint, handing over of a patient, emergency problem defusing potential problems or a request for an opinion or where a patient is. It is endless.* *You often get side-tracked by other problems such as a patient that decompensated or turned aggressive needing urgent sedation, or a new unstable patient that needs your immediate attention, or problem with staff or stock to do procedures.*
Decision-making load	*High density-thought processes;* *Event rate tempo is so high that people can't respond or focus;* *Your chain of thought has been interrupted and feels like you have lost momentum;* *No blueprint we can apply;* *I've been making +++ decisions that I am uncomfortable with;* *Mistakes creep in when I am interrupted too many times.*
Unsafe to practice	*Psychiatric patient attacked one of the nurses;* *A community that is threatening and they fight with us;* *I am gobsmacked that we have not yet had a massive drug error or more events here;* *They [psychiatric] patients are aggressive and will punch you.*

Human resources are constrained	*Short-staffed in all categories;* *…have an impossible workload of 1:20 nurse per patient ration;* *The roles of the doctors and nurses have merged to deal with nursing shortages;* *Our numbers have increased by 8% and we've not received any additional resources.*
Supply chain issues	*Poor stock management and poor communication between stores and the EC make for daily hassles with stock outage.*

Table 23 shows the advice that the storytellers offered to the new colleague (Box 4, page 121). No distinction was made between who gave the advice i.e. doctor or nurse. It was interesting to note that in most of the stories, the typical EC conditions were detailed without any advice to the new colleagues. This fits with the expectation (Table 23) that newcomers should 'just get on with it' without asking for much assistance or guidance. Those that provided advice told the colleague to be vigilant, think ahead, protect themselves and other team members, and develop strategies for dealing with visitors and interruptions.

Table 23: Advice provided to a new colleague on how to deal with challenges in the EC

Category	**Actual words used**
Be vigilant	*Always being on your toes;* *Be observant/ constantly aware;* *Trust your colleagues;* *Always vigilant for the distraction that is going to break the flow of the team;* *Be mentally prepared and get the job done.*
Think ahead	*On handover rounds identify the patients that can move when the need arises;* *Ensure a free resus bed at all times;* *Understand which challenges will be faced more often and as much as possible develop a systematic approach towards dealing with them.*
Protect others	*Take on the threats when they arrive to protect the juniors;* *It is important to make the nurses feel safe;* *Double-check things with the doctors as they often make mistakes.*
Protect yourself	*Do not turn your back on the psychiatric patients;* *Wear your TB mask all day long;* *Be prepared to be heckled, spat at, so have a tough outer shell.*
Self-orientate/ do not expect guidance or help	*There is no time to orient new people, you must know what's going on to work here and must be clear about what you are doing;* *In our unit you arrive, and you must fall in, there is not much of an orientation;*

	We are told to just ask the nurses if we have any issues or need to know anything; *Assume no hands to help and get on by yourself.*
Strategies to deal with visitors and relatives	*Restrict the visitors;* *Speak to one family member they can deal with the rest of the family.*
Strategies to deal with interruptions	*Make notes at the patient's bed;* *Dedicate one person to deal with enquiries;* *Don't get stuck at the desk;* *Ignore people that just want to ask something that they could've asked a non-medical person.*
General advice	*Beware of the territory between specialities, everyone is guarding their territory;* *Get the nurses on your side;* *Psychiatric patients – make sure that you get all the paperwork done;* *Just keep going and you have to accept that some people will die, and some will be unhappy, and you won't get to everyone;* *Get to know your team members.*

6.8 The patient

The patient was frequently mentioned, i.e. EC staff are highly aware of the patient (Table 24).

Note that the study is not about the quality or level of clinical care rendered.

Table 24: Stories about patient care

Category	**Example of a story**	**Summaries of statements**
Physical space	'*sometimes we have no physical space to deal with patient'*	Caring for patients on the floor; Patient in a chair that required resuscitation and no space to get patient onto a trolley; Patients in chairs requiring medication that are not supposed to be administered in a chair; No showers in the EC, so patients are bed washed.
Patient expectation	*'Patients have a right to expect quality care'*	Patients nag, interrupt and insult staff; Patients complain; Unreasonable demands from patients; The EC can not provide all the services that the patient might need.
Inappropriate arrival/referral	'*We get patient that should be at primary healthcare facilities'*	Patients come to the EC to avoid the clinic; Waste of time and resources to manage patients that should be at the CHC.

Crowding	'*Boarders that represent an entire ward, with no additional resources'*	Overflow of patients in the EC; Overcrowded; Boarders result in patients being discharged before they are ready; Patients staying in the EC for days.
Clinical cases with a focus on undifferentiated and critically ill patients	'*The real challenge comes in when there are critically ill patients some to young and very traumatic and even worse if they had to die in the EC'*	Critically ill children; Stab chests, gunshot wounds, collapse; Multiple resuscitations at one time; Patients that are unstable; Patients having seizures; Patients with chest pain.
Psychiatric patients	'*They'll punch you if you get close to them'*	Tik patients are sometimes aggressive and cared for between all the other patients; Psychiatric patient in EC for 15 days without adequate psychiatric care; Violent psychotic patients.

The patient is not an innocent recipient; patients participate actively in the dynamics of the EC and manipulate the system by bypassing primary healthcare clinics, calling for ambulances when it is not indicated or not complying with treatment, e.g. a patient with seizures who's drinking again, or a chronic obstructive pulmonary disease (COPD) patient who is smoking again.

6.9 Conclusion

This part of the findings focused on what the stories told was about, the words that were frequently used and metaphors. The storytellers described an environment that was interruption-driven, cognitively demanding and physically unsafe and resource-constrained. Patterns across the ECs were lifted out, as were the similarities and differences in the doctor's and nurse stories. The use of war metaphors, perceived lack of support and a focus on the current situation stood out. The different views held by doctors and nurses regarding each other's reality was highlighted. Their advice to the newcomer included being vigilant, thinking ahead and protecting self and others. They told the newcomer to not expect guidance and to invent strategies to deal with interruptions, visitors and other departments.

Chapter 7: SenseMaker® findings: the signifiers

7.1 Introduction

This chapter considers the self-interpreted part (known as signifiers) of the SenseMaker® study. A broad exploration of patterns in the signifier data was done prior to accessing the narratives. For the exploratory analysis, each signifier was plotted separately in R studio version 1.1. 463 (2009 to 2017) and then inspected for patterns and clusters (Please see Appendix 9, page 234 for these). After establishing patterns, these were explored in more detail. As usually happens in SenseMaker® studies, the data-set was not exhausted fully.

The theoretical construct i.e. the process of sense-making (Section 4.5.2, page 78) was used to develop a storyline from the signifiers. At first, only the signifiers as is were considered for patterns, and then the second level of analysis was done using the multiple-choice questions to 'slice' the signifiers.

To keep the orientation in this chapter, the findings are organised according to the process of sense-making, and each section will be indicated.

Table 25: Chapter orientation

Process of sense-making	**Chapter label**	**Section**
Noticing a cue within the flux, bracketing and labelling the cue	Information	7.2, page 140
Acting on the cue and presumptions that the action is based on	Action	7.3, page 149
Consequence of action	Consequence/outcome	7.4, page 154
Communication - perspectives about methods and with whom	Communication	7.5, page 158
Trust, social cohesion, support	Social factors	7.6, page 162

7.2 Information

How the availability of information is perceived came through as an important theme. This included differences in how professional roles and the role fulfilled in their story viewed information, the views held by management versus those of the team as well as differences in the emotional tone attached to the story.

Box 5 helps with the orientation to the chapter, and the box will be repeated at the start of each new section to aid in navigating the chapter. The section that is being dealt with will be highlighted. This section deals information – how cues/incoming information was viewed, processed and managed.

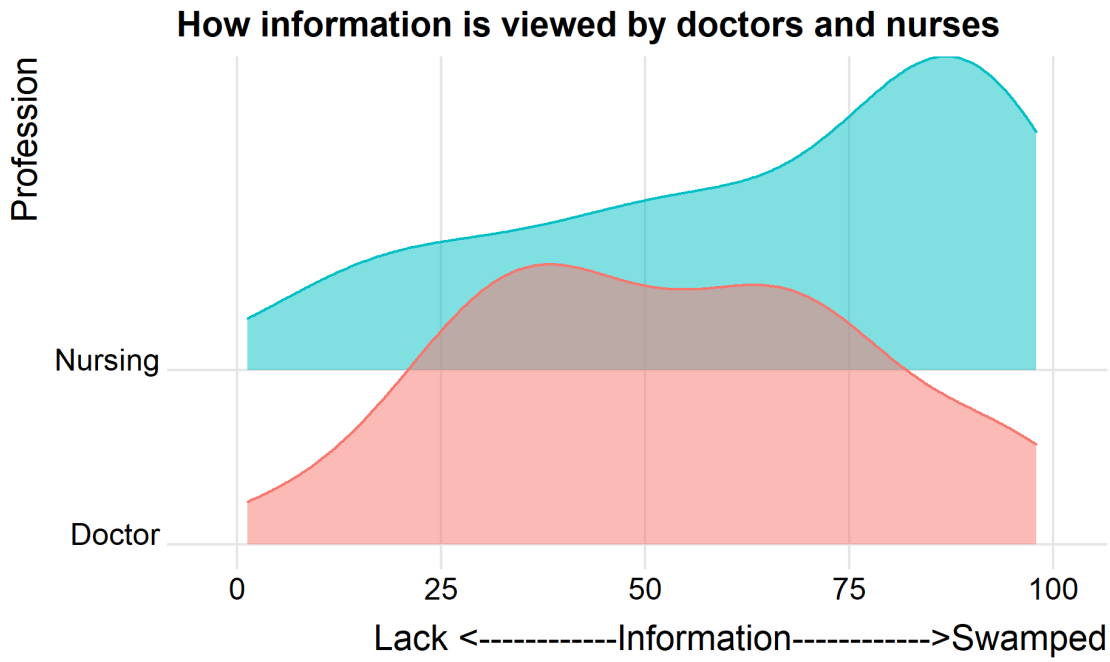
Box 5: Chapter orientation: Information

Information processing and management
Action
Consequence/ outcome of action
Communication
Social factors

7.2.1 Information asymmetry between doctors and nurses

Doctors and nurses held different views regarding the availability of information (Figure 31). Nurses were more likely to feel swamped by the availability of information, whilst the doctors held a more balanced view.

Figure 31: View of availability of information



There were similarities in the stories told by doctors and nurses at both extremes (Table 26) e.g. fuzzy boundaries were mentioned at the extreme of lacking information as well as the extreme of feeling swamped. Both professional groups told stories that included being shouted at, workload, pressure, not feeling supported and staff shortages.

Table 26: What the stories with strong views about the availability of information were about

Lack of information	Swamped by information
Being shouted at	Dealing with complaints
This is a hotspot	This is a risk to staff
Unsafe situation	Chaos
Infighting	Pressure
Aggressive patient	Doctor/nurse ratio
No management support	No support
We were shouting at each other	Hectic
Fuzzy boundaries between doctors and nurses, due to nursing shortages	Being insulted and physically attacked by patients

Other than professional role, there was a relationship between how the availability of information was perceived and the role which the storyteller fulfilled in their own story. The different roles had different perceptions regarding the availability of information e.g. those who made decisions and acted as a link held views that were predominantly concentrated at the mid-point i.e., they felt that they had the right amount of information available to them. On the other hand, those who raised the alarm and followed orders were more likely to feel swamped, whereas those who watched from the side-lines, were most likely to lack information. The storytellers that opted for the role of watching from the side-lines all told stories about psychiatric cases and the stories were all told by nurses.

The role that the storyteller occupied in their story determines the type of information they hold and can access, for example the observer at the side-line could notice factors that those deeply involved in a situation are not seeing. The role impacts on the type of information required and the decision-maker might require different information to the person that is following orders.

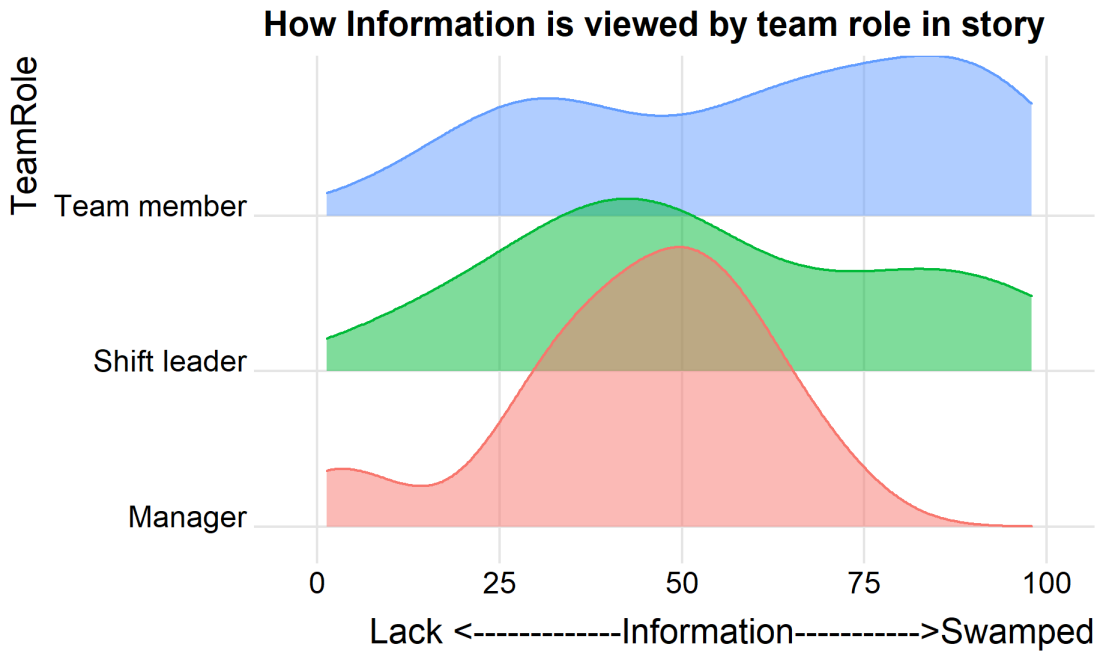
The value lies in recognising that different story-roles hold different perspectives and have access to different aspects and interpretations of information. That said, access to more information would not necessarily improve the sense-making, as more information could result in feelings of being overwhelmed that negatively impact sense-making (11). Thus, the quality of the information is more important than the quantity of information.

7.2.2 Managers and information asymmetry

The self-identified managers or shift leaders held a balanced view of information availability, meaning that they were satisfied with the information at hand (Figure 32). The team members' responses were more spread-out with two bumps on either side of the mid-point. Thus, managers may have adequate data available to them whilst the other roles may either

receive too much, too little detail or the information received across the roles may be different.

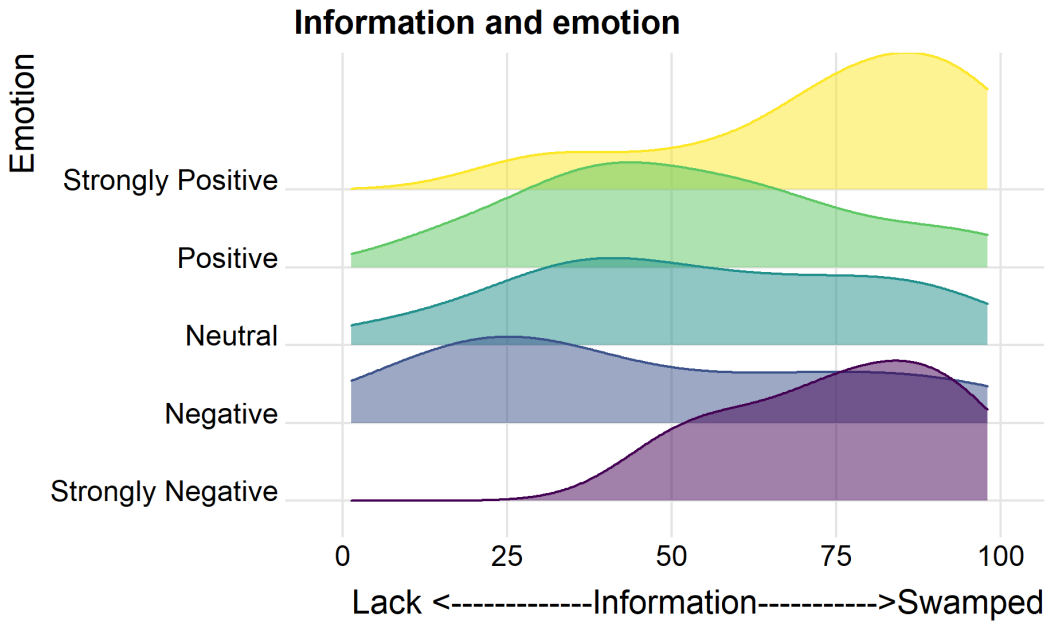
Figure 32: Availability of information and management



7.2.3 Views on information and emotional tone

Figure 33 shows a link between how information was perceived during the event and the emotion attached to the story. Those who retrospectively rated their story as strongly negative or positive were more likely to feel swamped with the information flow during the event that they shared.

Figure 33: Availability of information and emotion

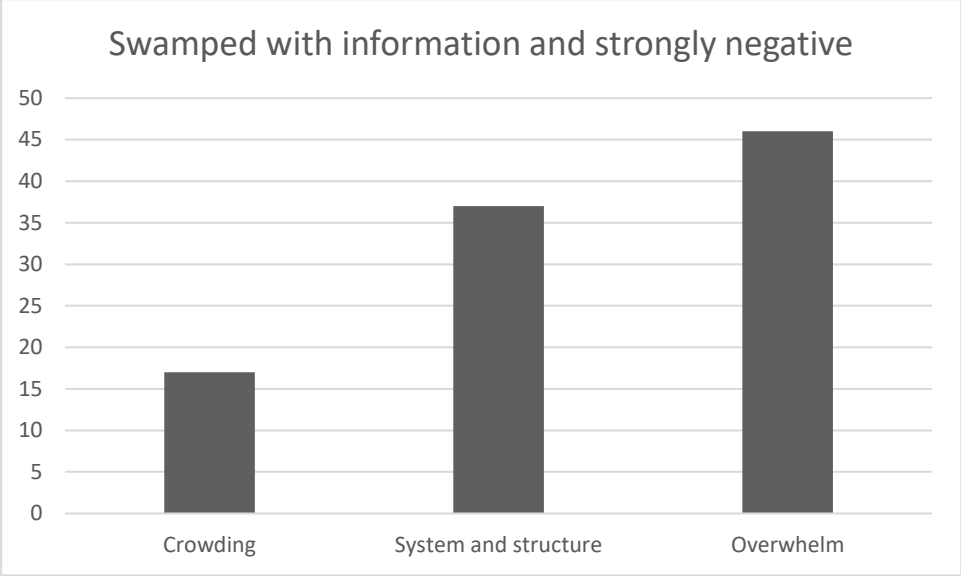


Stories rated at the negative extreme were more likely to refer to emotional responses e.g. frustration, stress or feeling scared rather than processes or conditions e.g. crowding, communication or systems issues. The very negative emotional responses usually referred to overwhelm e.g. using words such as feeling scared, abandoned, bullied and betrayed. A metaphor at the extreme of negative emotions is narrative 71; the storyteller shares a metaphor where working in the EC is compared to a child that is being sexually assaulted (raped) in a locked room, whilst hospital management - representing a parental figure - stands behind the door, knowing exactly what is going on and whispering words of consolation to the child – it's ok, you will be ok (Translated).

Stories about systems and structures referred to hospital management, miscommunication, being short-staffed and under/wrongly utilized. Figure 34 shows the main groupings of stories that rated strongly negative and feeling swamped with information.

Figure 34: What stories dealt with that were rated very negative and feeling swamped with information

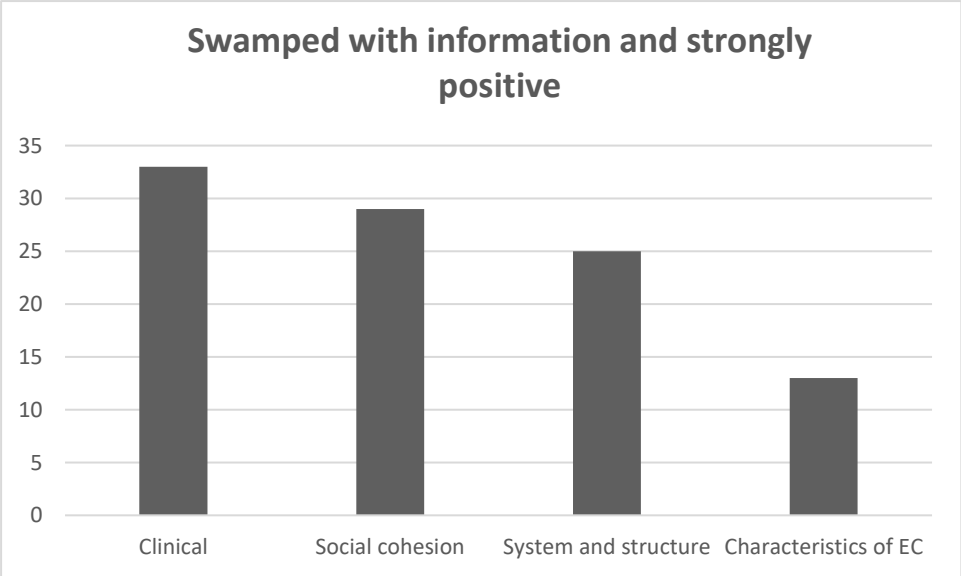
Shown in percentage



There were 4 groupings in the stories that rated as strongly positive and feeling swamped with information. As seen in Figure 35, most of these told stories about clinical incidents and social cohesion.

Figure 35: What stories dealt with that were rated as strongly positive and feeling swamped with information

Shown in percentage



Regarding Figure 35, those that told stories about clinical incidents usually spoke about life-threatening situations e.g. resuscitations, whereas social cohesion dealt with the team, feeling like a family and looking after each other. Stories about system and structure appeared in both positively and negatively rated stories. Noteworthy here is that the positive stories about system and structure dealt with pressure, mistakes, crisis management, being shouted at, yet the participants rated their stories as simultaneously feeling swamped with information and rating the incident as positive.

From Figures 34 and 35, it emerged that those who rated their stories as strongly negative and felt swamped by information were more likely to tell stories about situations external to their control e.g. system issues and crowding, whereas those who felt strongly positive tended to tell stories about clinical emergencies with positive outcomes, about the team and moments in which they were able to learn important things.

Strongly positive stories were more likely to mention both doctor and nurse, whereas strongly negative stories spoke about 'they' or 'them' without specifying who the person was. Strongly negative stories demonstrated a disconnect, e.g. perceived injustice and double standards in the hospital. Participants telling these stories used strong language to express themselves, including metaphors and words like bullies, injustice, circus, hell, a war zone. Three stories that rated strongly positive came across as negative because they mentioned verbal (two stories) and physical (one story) abuse.

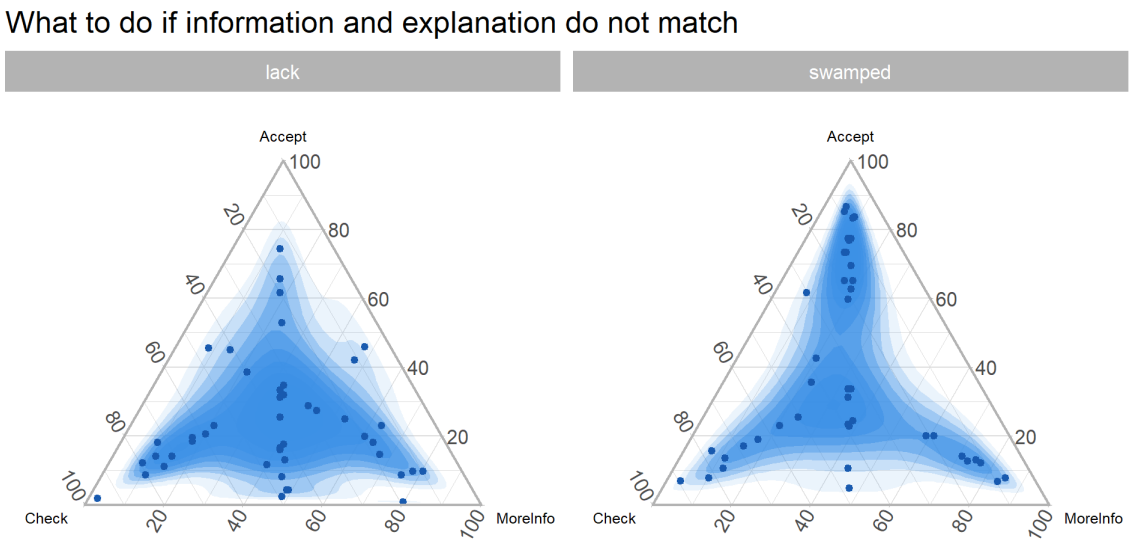
There may also have been a degree of attributional error in the emotional response, where individuals made dispositional attributions for their success and situational attributions for their failures. Thus, negative stories or things at the extreme were not their fault – they were related to the system, the manager or the hospital. But when things went well, they ascribed them to their individual ability.

7.2.4 Gaps in information

The data/frame model (Figure 2, page 22) was used to explore how the storytellers dealt with situations where the information available and their plausible explanations were not matching. The options were to check and reinterpret information, live with the difference or look for additional information. Figure 36 shows the difference between how those that felt information to be lacking, and those that felt swamped with information, perceived the best way to deal with this ambiguity. When the available information and plausible explanation did not match, those that perceived the information to be lacking would recheck the information or search for more information, thus questioning their existing mental frame, re-

framing or comparing frames; whereas a cluster of those that felt swamped by the available information would accept the difference and continue without checking information or seeking more information– thus preserving the mental frame.

Figure 36: Dealing with uncertainty in data and mental framework



As discussed in Section 2.5 (page 18), there are various possibilities for this finding – it could point to inattentional blindness, linked to position in hierarchy e.g. they felt that even if they did not know what was going on someone else would, or that it is not their job to know, understand or interpret the ambiguous information. Alternatively, they may accept information even if it is ambiguous or confusing, simply as a coping mechanism. Or, people may choose not to speak up in order to remain accepted as part of a social group (61). Regardless of the potential explanation, the pattern suggests that not everyone in the EC is situationally aware and/or sensitive to ambiguous deviation.

There were 10 stories positioned at the triad corner of 'live with the difference'; five from doctors and five from nurses (Table 27).

Table 27: Living with the difference, when information and explanation do not match

Role	Emotion	About
Doctor	Positive	Month-end chaos. Says: '*Just keep going. You have to accept that some people will die, some will be unhappy, and you won't get to everyone. If you can accept this, you will be fine*.'
Doctor	Positive	Give and take, gotten used to interruptions, good stuff happens because of goodwill
Nurse	Negative	Challenges and interruptions
Doctor	Negative	Alone in the resuscitation room, the nurse does not understand the seriousness of the patient's condition
Nurse	Neutral	Isolation patients positioned between other patients – not right, unsafe
Nurse	Neutral	Overwhelmed and staff shortages, agency staff in the EC at month-end
Nurse	Neutral	The story lists challenges e.g. short-staffed, rude patients
Doctor	Strongly negative	The patient died because the team couldn't get him/her to resuscitation room in time
Nurse	Strongly negative	Felt scared due to an uncontrolled situation in the EC
Doctor	Strongly negative	Double standards, lack of support from management

Those likely to accept and live with the difference between a mismatch of information and its explanation were likely to tell stories about overwhelm, challenge and interruption. This seemed to occur regardless of role and/or emotional tone. It was noted that none of the stories in which participants perceived feeling overwhelmed with information and 'living with the difference' when information and explanation did not match, retrospectively rated the emotional tone as strongly positive.

Doctors and nurses held different perspectives regarding information, with the nurses typically perceived being swamped by the quantity of information. One interpretation is that it could be due to the EC nursing responsibilities extending to rendering nursing care to the boarders (Section 5.3.4, page 104). This means being attentive to various formal information streams and hospital guidelines e.g. medical ward information, documentation and rules, as well as following surgical ward and EC guidelines. Essentially they are expected to follow the various ward routines, as well as the EC routine, increasing the complexity of the nursing role in the EC. Additionally, a number of 'onerous' rules applies to the nurses (Figure 15, page 105), and evidence of them being 'punished' when they do not follow the rules are seen in this narrative shared by a doctor:

'...the one night it was chaos and we had a nurse that was doing amazing, then the next day we heard that the nurse was called in for a disciplinary because he forgot to place a sticker on a bag with patient's clothes' (Narrative 68)

The doctors and nurses that indicated that they felt extremely swamped with the inflow of information told similar stories of feeling pressured and experiencing chaos. And, when rating the emotional tone of their story, they were more likely to select an extreme emotional tone – selecting either strongly positive or strongly negative as opposed to selecting positive, neutral or negative. This points towards the established link of emotional tone influencing workplace perception.

A cluster of storytellers that indicated feeling swamped with the influx of information said that, should the information at hand and their plausible explanation not match, that they would accept the difference. This implies that they would not seek to resolve the discrepancy. If this is true, it suggests that important cues may not be anticipated or responded to. The result of missing these cues could create operational and clinical failures e.g. adverse patient events.

The lower-category nurses were the most likely group to select this combination of signifiers, and the worry is that this is the category nurse that typically triages patients according to acuity, thus playing a crucial role in controlling the patient flow and priorities for treatment (Section 3.5, page 52, Figure 11, page 100 and Table 12, page 111).

7.3 What to act upon

Taking action is an instrumental aspect of sense-making and when people act, the situation is likely to change. People act within the scope of the presumptions made about the elements that they noticed and bracketed as needing attention. The appropriate action thus depends on the information processing capabilities and the assumptions regarding situations. Observation, acceptance, silence or knowingly withholding information are all actions (Section 2.5.5, page 23 and Section 2.2.2, page 14)(7, 25).

Box 5 helps with the orientation to the chapter, and this section deals action – the actions taken and the presumptions regarding possible actions.

Box 5: Chapter orientation: What to act upon

Information processing and management
Action
Consequence/ outcome of action
Communication
Social factors

After noticing or selecting information, the storytellers need to respond (Section 2.5.5, page 23). Their response or actions are informed by their mental frameworks, what they consider to be plausible explanations and their assumptions. This part of sense-making is what Dervin in her Sense-Making Methodology refers to as gap-bridging, and it constitutes movement from the current position to where the sense-maker believe they should move/the desired outcome (20).

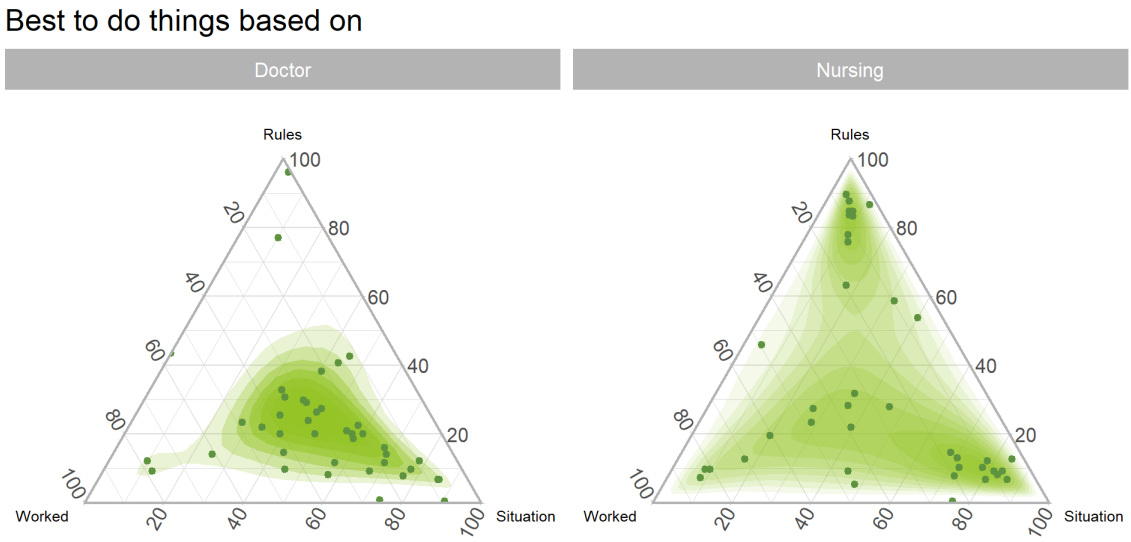
7.3.1 Professional role and the best course of action

There was a difference in what doctors and nurses felt would constitute appropriate action (Figure 37). The nurses were divided, with clustering at 'following the rules and policies' or 'according to the situation' whereas doctors are more likely to act based on the current situation.

Those more likely to be informed by rules and policies are less likely to adapt to a situation. Furthermore, they may find it confusing if the situation requires actions or responses not stipulated in the guidelines (16). The cluster towards the middle of the triad shows the storytellers that felt that all three corners should be weighed equally; implying that they view the best course of action as contextual.

There were six stories towards the corner of what worked before, and that the experiences gained, and lessons learnt are not shared amongst peers and others, resulting in people treating every situation (regardless of the frequency of the occurrence) as novel. Not sharing learning and failures implies an inability to tap into the shared knowledge of 'what has worked before'. This could hamper the ability of the EC to holistically learn from mistakes and resolve systemic problems. Other than a lack of organisational learning, the findings suggest that the feedback loops are currently inadequate.

Figure 37: Doctor and nurse perceptions of appropriate action



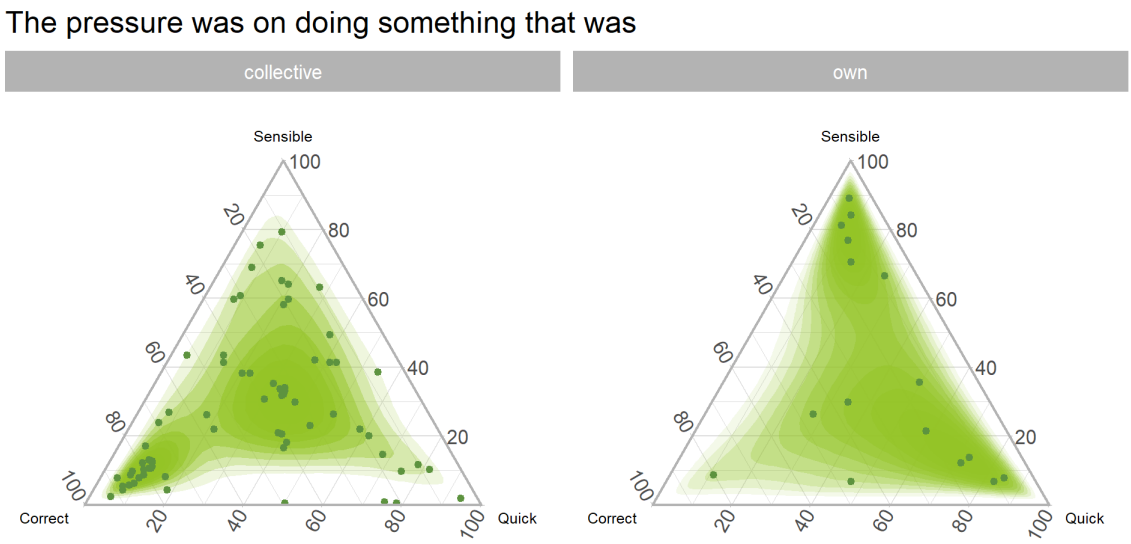
7.3.2 Perceptions of the pressure to act

There was a link between decision-making and the perceived pressure to act (Figure 38). Those who viewed the EC functioning as a team taking collective decisions were more likely to experience pressure to do the correct thing, whereas those who viewed decisions as individuals deemed the pressure to act aimed at being sensible and quick.

Those that wanted to do the right thing comprised of the lower-category nurses, participants with less than six-month tenure and those that followed orders (role in the story). The deduction is that those with the lowest levels of authority, autonomy and decision-making power felt the most compelled to do the 'right' thing. This might include views that voicing opinion or disagreement is not the 'right' thing to do. If such views are held, it could hamper the sense-making abilities of the EC as a collective whole (Section 3.8, page 55) (66, 68, 73, 210).

Stories about clinical situations were dispersed towards the middle of the triad, possibly because the required action had to be correct, sensible and quick rather than correct; but maybe too slow for a clinical emergency, or quick but not sensible.

Figure 38: Pressure to act with decision-making



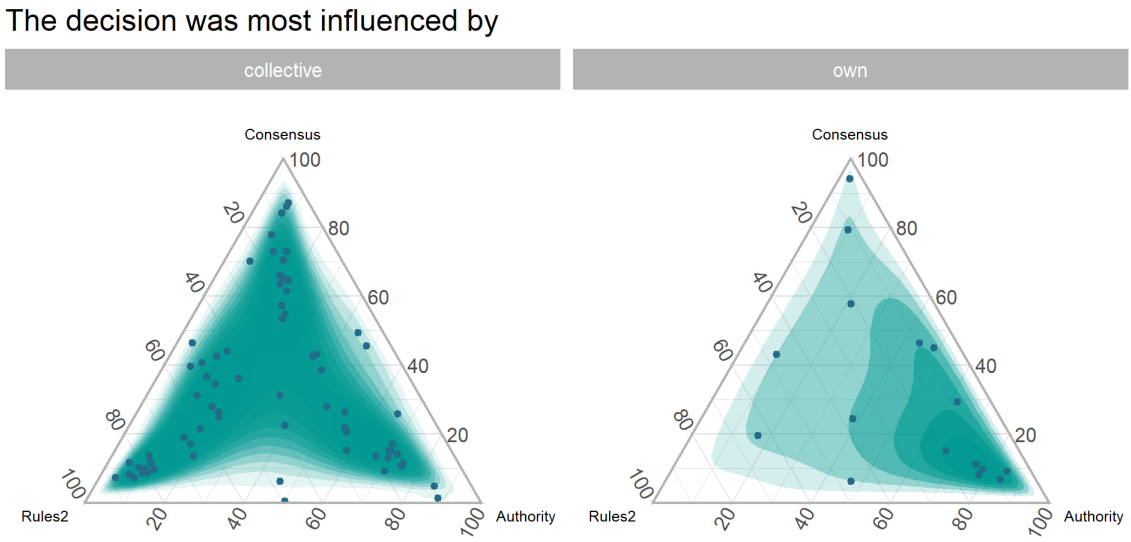
7.3.3 Influence on decision-making

Decisions are influenced by authority, the rules or consensus. In Figure 39 it is demonstrated that those that viewed decision-making as individual held different opinions to those that viewed decision-making as collective.

Those that view decision-making as collective are evenly represented on the triad, also the doctors and nurses were evenly distributed at each corner. These are good signs, as it shows enough diversity in collective decision-making to provide resilience.

Those viewing decision-making as individual choices are grouped at 'the decision was most influenced by an authority figure'. These patterns raised a few questions e.g. would these storytellers speak up if they disagreed with a decision? Did they not view it as part of their role to participate or make a decision hence them opting for individual decisions that are probably taken by a person with authority? And, if they were determined to do the correct thing, do they view following orders as the correct thing, and speaking up or disagreeing as incorrect?

Figure 39: Influences on decision-making



Combining the findings of perceived pressures to respond (Figure 38), and what influenced the actions (Figure 39), it shows that the nurses are more likely to select wanting to do the right thing by following the rules. The rules are not always explicitly stated or easily accessible, for example policy files were outdated, incomplete and locked in the manager's office with decision-making power centralised outside of the EC (Section 5.2.3, page 95). This might be compounded by the steep nursing hierarchy and the EC nursing representation being mostly lower-category nurses that require supervision within a narrow scope of practice (Figure 9, page 94; Section 5.3.6, page 110; Figure 11, page 100 and Figure 19, page 113).

Sticking blindly to the rules reduces the chances of noticing emergence (11). On the other side, tacit knowledge is acquired by learning from repeated occurrences. Even though the doctors were more likely to act according to the situation, it appears that every situation is considered as novel. And the prevailing quick-fix mentality does not allow for reflection and sharing lessons to develop expert knowledge on how to deal with the recurring operational situations (Section 6.4, page 123). Induction processes are lacking, and especially doctors may not be socialised with regards to the expected behaviours or informed about the structures, i.e. rules or resources, available to help them deal with certain operational situations (Section 5.3.6, page 110).

7.4 Consequence of action

As people act, the original situation shifts resulting in anticipated or unanticipated consequences. Box 5 helps with the orientation to the chapter, and this section deals with how the participants viewed the consequence or outcome of the action.

Box 5: Chapter orientation: Consequence of action

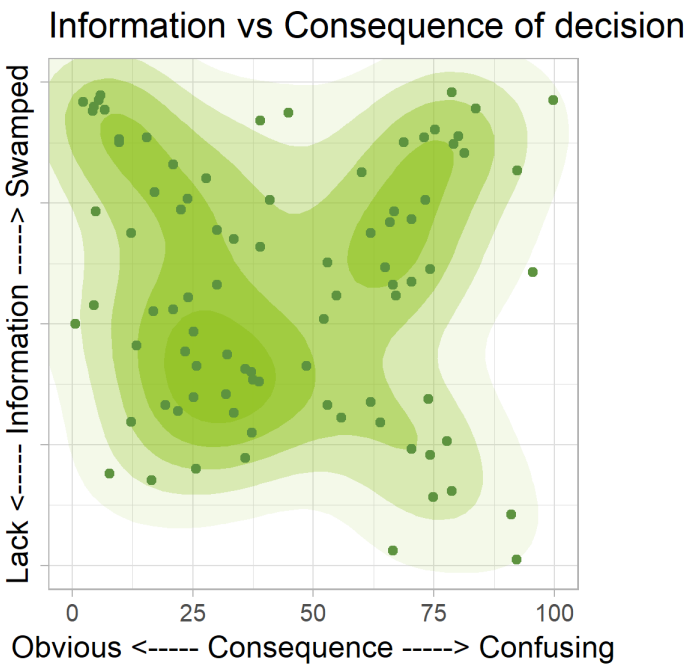
Information processing and management
Action
Consequence/ outcome of action
Communication
Social factors

7.4.1 Consequence and availability of information

There was a difference in how people viewed the availability of information and the consequence of the decision. As seen in Figure 40 there were three clusters of stories:

a. Feeling swamped with information and the consequence of the decision is obvious;
b. Feeling swamped with information and confused about the consequence; and
c. Enough information and obvious consequence to the decision.

Figure 40: Connection between information flow and consequence of decision-making



There were two distinct patterns at the extreme of 'swamped'. Overall, stories that indicated a feeling of being swamped with information followed storylines of dealing with complaints, chaos, being under pressure or insulted, and dealing with staff shortages. The difference between participants in the 'swamped' category was that those who viewed the outcome of their decision as obvious, tended to offer solutions to their predicament, whereas those who were swamped and confused experienced a sense of helplessness about conflict, support and isolation.

The top left corner of Figure 40 shows those who felt swamped with information, felt that the consequence was obvious, and offered solutions to the issue/s despite not being prompted to do so.

The top right corner shows those who felt swamped with information, where the consequence of the decision was unclear, and who had told stories dealing with conflict, multiple high-density tasks and feeling isolated.

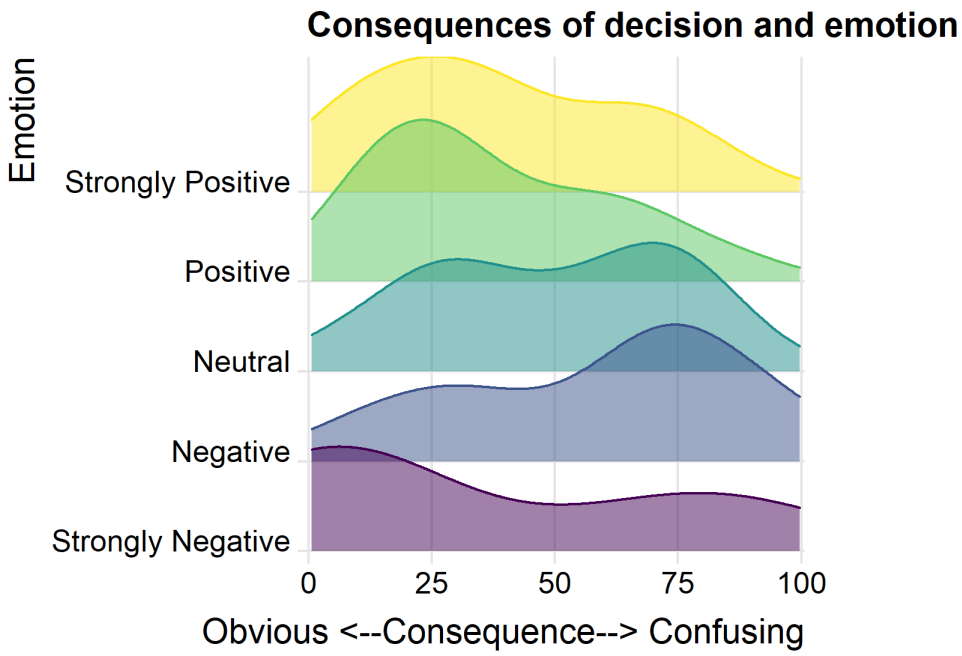
The cluster at the lower left, views information as neutral and the outcome of decisions as obvious, and told stories about unsafe situations, lack of support and abuse, with fuzzy boundaries between doctors and nurses.

7.4.2 Consequence and emotion

Storytellers that viewed their stories as positive were more likely to view the consequence of the decision as obvious, whereas those that viewed their story as negative stated the consequence as confusing (Figure 41). Storytellers that rated their stories as neutral had a spread-out distribution between obvious and confusing.

The finding suggested that there is a link between perceptions held regarding the consequence of the decision and emotions when thinking back at the situation. In addition to the similar findings in information, the findings suggest a strong link between emotions and the ability to process information and 'understand' consequence/impact of their actions (Section 7.2, page 140). Both Weick and Dervin emphasise the role of emotions on sense-making (7, 52).

Figure 41: Consequence of decision-making and emotional tone



The stories were considered to see whether the stories provided further insights into the connection between the emotional tone and consequence of the decision. The stories at the extreme of 'obvious consequence' offered solutions to problems in the EC e.g. using ratios for staffing (Table 28). Those that viewed the consequence as 'confusing' spoke about breakdowns in communication between doctors and nurses (Table 29).

Table 28: Solutions offered in stories at the extreme that the consequence of decisions is obvious

The solution offered in the story
Use set ratios for staffing
Involve inpatient teams to do their bit
Solve the hospital issues that manifest in the EC
Stop accepting abnormal behaviours and situations
Psychiatric patients should go straight to the relevant ward

Table 29: Stories at the extreme that the consequence of the decision is confusing

Stories about a breakdown in communication/no support
Alone in resus room, with nurse not understanding the seriousness of the situation
Doctor in resus didn't consider the inputs of the nurses, resulting in a deteriorating patient, resuscitation, nurses felt undermined and everyone shouted at each other
Had to simultaneously deal with a psych patient and stab wound in the chest. No comment from rest of team/help
No orientation received on first shift told just to ask nurses if unsure
Feel blocked from rendering patient care

The stories about a breakdown in communication (Table 29) all seem to refer to a breakdown in communication between the professional roles e.g. the nurse not understanding the seriousness of the situation versus the doctor not considering the inputs of the nurses. As these are linked to a negative response on emotion, it is possible that communication failures perpetuate feeling confused/overwhelmed by consequences as well as experiencing situations as negative.

There is a possibility that those experiencing the consequence as confusing did not feel psychologically safe, or that it is their responsibility to question decisions or offer (obvious) solutions to situations.

Those that viewed consequence and occurrences in the EC as confusing were more likely to share a story about miscommunication. However, those viewing the consequence of decisions as obvious were probably applying heuristics e.g. stories about delaying triage to first sort out the ward functions or 'eyeballing' patients. In the following narrative, the storyteller refers to a heuristic that the more junior/less experienced staff are not yet doing.

> *'This day the doctor in resus was a junior doctor and did not want to listen to staff working in the resus area to move patients so that we can have space for sick patients that needs emergency care. The doctor ignored my requests, then there was no space in resus at the time a very unstable patient arrives from triage…the doctor was not sure how to manage the patient…we were shouting at each other from frustration' (Narrative 82)*

7.5 Communication

The questions relating to communication in the SenseMaker® survey are used to explore the mechanisms used to share insights, the level of trust and the pathways used to share insights and assumptions. Box 5 helps with the orientation to the chapter, and this section deals the assumptions regarding communication.

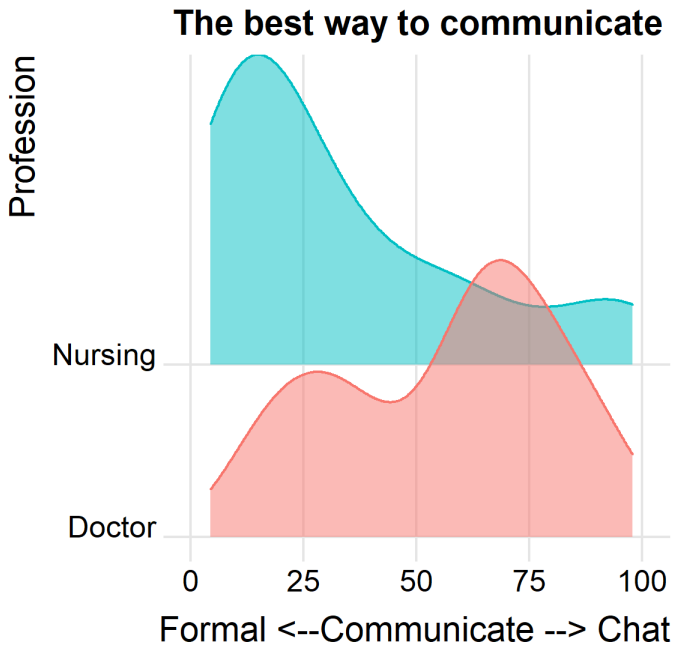
Box 5: Chapter orientation: Communication

Information processing and management
Action
Consequence/ outcome of action
Communication
Social factors

7.5.1 Communication methods and pathways

Sense-making requires established communication pathways, as seen in Figure 42 there is a breakdown in communication pathways between doctors and nurses.

Figure 42: Communication pathways



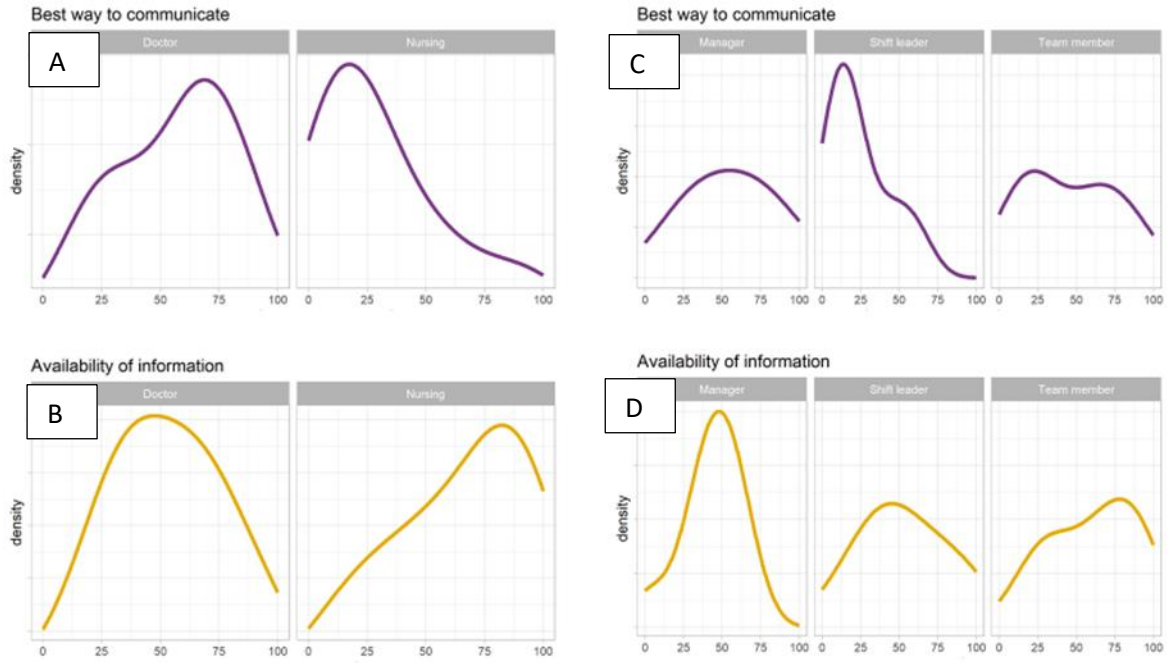
More than half of the doctors indicated that they found it best to communicate informally, whereas nurses indicated that formal communication worked best for them. This suggests that despite doctors and nurses 'collaborating' they might be speaking past each other.

There were further indications of a breakdown in communication between the different nursing categories, as there was a difference within their responses. The lower-category nurses (Enrolled Nursing Auxiliaries and Enrolled Nurses) were likely to prefer formal communication, while higher category nurses were evenly balanced. This could fit with the Nursing Council not acknowledging the lower categories as independent practitioners and them consequently being socialised to require orders, rules and formal processes (153).

7.5.2 Information and communication

The purpose of Figure 43 is to visualise the marked differences between the professional roles, communication and information.

Figure 43: Dissimilar views on communication and information



In Figure 43 the differences in how doctors and nurses regard communication and information is demonstrated on the left side (marked A and B); whilst the right side of the Figure (marked C and D) shows the perceptions of self-identified managers, shift leaders and team members regarding communication and information. The purpose of combining these visualisations into one figure is that it makes it easy to see the different patterns of beliefs regarding the best way to communicate with each other and the availability of information.

Figure 43 demonstrates that there are no shared views between different professions and team roles regarding what constitutes accepted communication methods and adequate information.

When considered in conjunction with Figure 42 (page 158) it seems that nurses are more likely to believe in formal communication and are also more likely to feel swamped with information. Additionally, they are more likely to accept information, and not question or recheck it if it doesn't match with plausible explanations. Nurses are more bounded by following the rules, procedure and wanting to do the correct thing (Figure 37, page 151). In the nurses' stories, there was evidence of espoused beliefs regarding positional power that appears to correlate with a belief in formal communication.

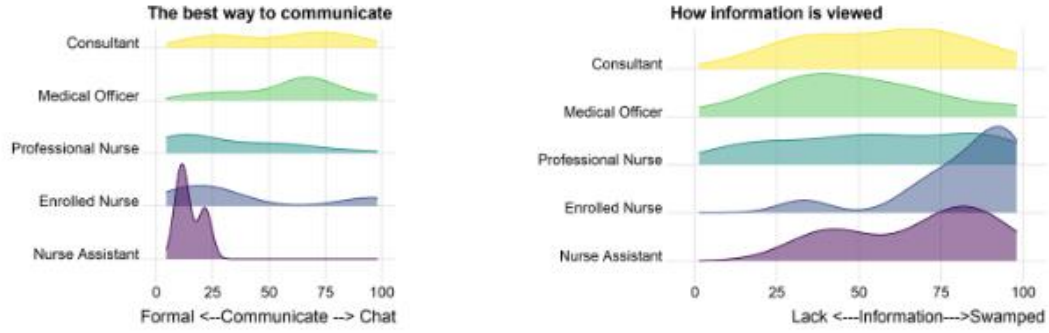
Various studies allude that even in life-threatening situations, nurses are likely to remain quiet and not speak up (Section 3.8, page 55 and Section 7.3, page 149). Figure 42 suggests that even when they are 'speaking up', the nurses might not feel 'heard'. This could contribute to the nurses sharing stories of 'us-versus-them' and a sense of helplessness.

Doctors seemed more likely to have a more balanced view of information, as well as perceptions on communication being more balanced and leaning towards informal communication.

The attention was turned to see whether the different qualifications within each professional role have similar views on communication method and availability of information (Figure 44). Professional Nurses hold more evenly dispersed views regarding communication and information, with the Enrolled Nurses and Enrolled Nurse Auxiliaries more likely to hold extreme views regarding formal communication and to feeling swamped with information. The lower-category nurses form the larger number of nurse categories in the ECs (Table 12, page 111 and Figure 19, page 113), and were poorly represented in the SenseMaker® survey. If these differences are widely spread, then it could result in miscommunication within the nursing cadre, and with the doctors. This needs further investigation.

It was further noted that the most senior qualifications in each profession i.e. Consultant and Professional Nurse held views that were balanced across the range, this is good for resilience.

Figure 44: Variation in professional qualification

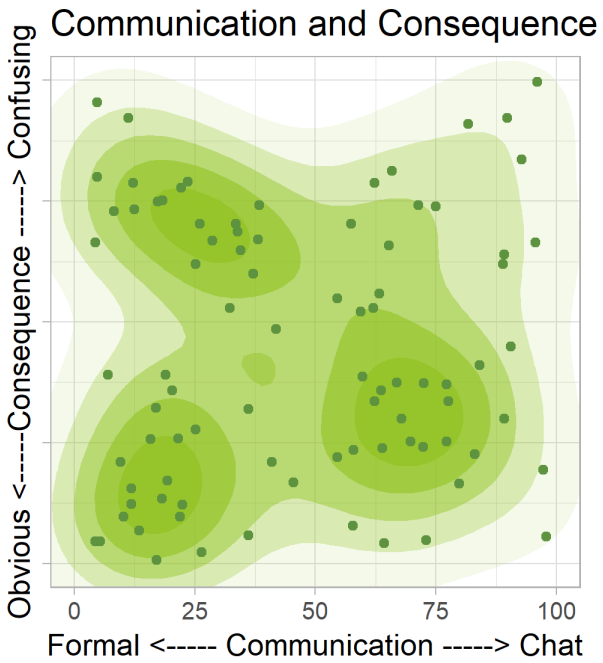


7.5.3 Consequence of decisions and communication method

Figure 45 shows three clusters. Most noticeable is the cluster at the left bottom corner referring to those that prefer formal communication and to whom the consequence of decisions seemed obvious. As mentioned earlier, the stories showed that those who deemed the consequence of the decision as obvious were more likely to offer solutions (Table 28, page 157). It is possible that when those who prefer formal communication are unable to perceive the consequence i.e. when what should be obvious does not occur, these team members may feel confused. Further, what is obvious might in their minds be predicted by the rules.

The cluster at the top left corner was mostly about 'the team'. These stories were equally balanced on the level of emotional tone and there seemed to be a link with this and positional power, with storytellers mentioned feeling guided by the manager or shift leader. Additionally, stories appeared to be 'command-driven', with assumptions and beliefs about what others should be doing being given without offering feasible solutions.

Figure 45: Perceived consequence of decision-making and communication style



7.6 Social factors

Social cohesion includes aspects like collaboration, trust, professional identity and perceived level of support. Social cohesion would influence who people communicate with and whom they share their sense-making with. Box 5 helps with the orientation to the chapter, and this last section deals what was grouped together as social factors, including views on collaboration, trust and support.

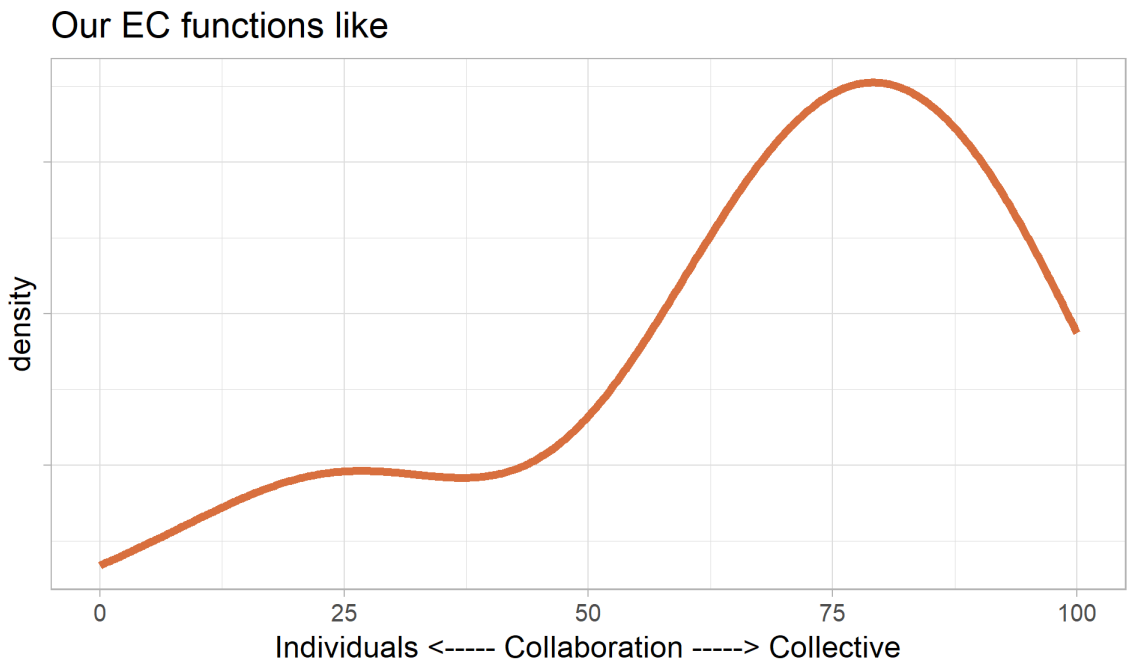
Box 5 Chapter orientation: Social factors

Information processing and management
Action
Consequence/ outcome of action
Communication
Social factors

7.6.1 Collaboration

The storytellers generally indicated that in situations like the story they shared, the EC functions as a team taking collective decisions, rather than as individuals each making their own decisions (Figure 46).

Figure 46: In situations like the one that the storyteller told, the EC functions like



Those that felt strongly positive about their story and viewed decision-making as collective told stories about *family*, *my motivation*, being *happy to come to work*, the opportunity to learn and clinical cases.

There was one outlier that was rated negative at the extreme of 'collective'; it was told by a doctor who felt that the nurses in it had not understood the seriousness of the situation (Narrative 44). The story was titled *Alone*. While this story was interpreted as the doctor feeling isolated and expecting more collective decision-making, it was found – on further inspection – that the storyteller had less than six months of experience in the EC.

The combination of patterns in Figure 39 (page 153) and 47 (page 164) raises a new set of questions about collective sense-making – when team members view decisions as extremely collective and positive, do they blindly accept and trust the other staff/team members? If yes, then it could imply they are blinded to certain cues.

7.6.2 Trust

The storytellers shared that they are more likely to trust, even trust blindly (Figure 47). Those that trusted blindly could be divided into two disparate groups either telling stories about team or stories about overwhelm (Table 30).

Team: This group told stories of '*family*' and '*team*' and used '*we*' and '*learning experience*'.

Challenge/overwhelm/dependence: This group told stories of being shouted at, and of interruptions, challenges and/or multiple concurrent tasks.

Figure 47: Perceptions on trust

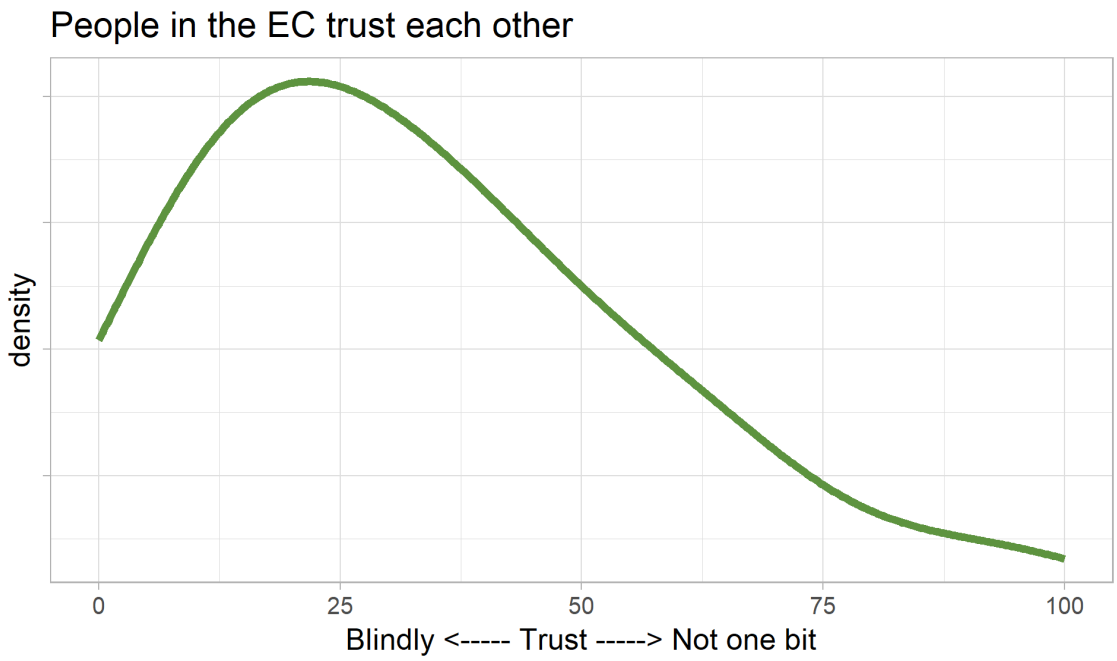


Table 30: Disparate groups that trust blindly

Shows the actual words used

Role	Emotion	Story is about
Team		
Nurse	Strongly positive	My reasons – motivated, experience, people-orientated
Nurse	Strongly positive	Team, experience, learning a lot
Nurse	Strongly positive	We are family, look after one another
Nurse	Neutral	Teamwork, everyone is involved
Nurse	Positive	Enjoyable and overwhelming
Nurse	Neutral	The team identified issues and worked at these, a consistent learning environment
Challenge/overwhelm/dependence		
Nurse	Negative	Risky business, isolation patients
Nurse	Strongly positive	Shouted at, threatened, yet looking forward to each day
Nurse	Strongly negative	Bullied, couldn't look after patients, we work hard
Doctor	Positive	Hiccups versus irritation, unable to complete tasks, interruptions. Balancing act
Nurse	Positive	Challenges faced e.g. with agency nurses
Nurse	Neutral	Hectic, mention staff shortages
Nurse	Negative	Hotspot, not supported by management
Doctor	Strongly positive	Multiple resuscitations, overloaded taxi, trying to get everyone somewhere in safety

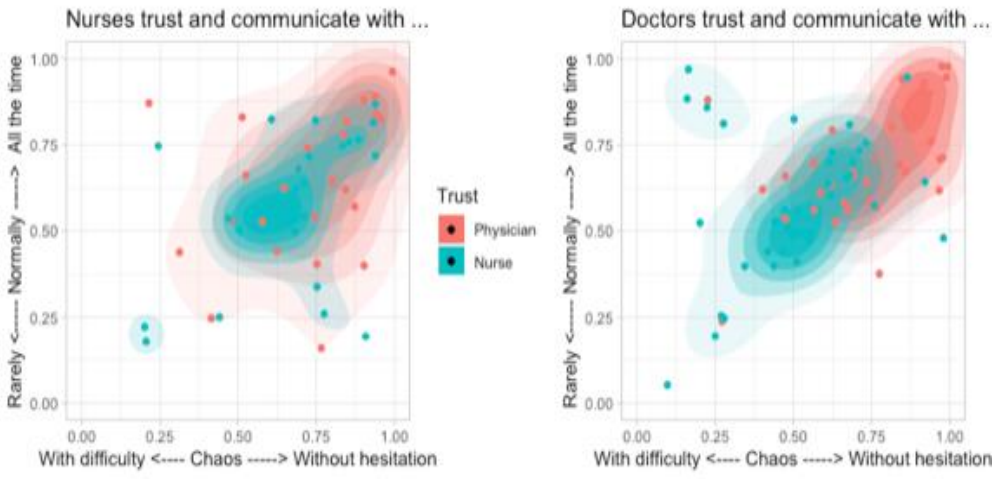
Those that chose blind trust and told stories regarding overwhelm might be referring to an idealistic state of being able to trust blindly. Nurses were far more likely to state that they trust blindly (Table 30) and represented 12 of the 14 stories at the extreme of 'trust blindly'. This could refer to the acceptance of orders and a degree of inattentional blindness to not questioning cues.

At the extreme of no trust, there were only three stories. Two of these stories were told by doctors, both of which referred to conflict situations with nurses. The third story was told by a nurse and was about a doctor who undermined her input and concerns; the situation escalated to resuscitation. All three participants/storytellers experienced the situation as negative.

7.6.2.1 Trust and profession

There is a relationship between trust and communication (Figure 48), with doctors and nurses holding different perspectives on whom to communicate with during normal conditions versus crises. Doctors tend to trust their colleagues all the time and without hesitation, whilst trusting nurses less than they trust other doctors. A few doctors indicated that they trust nurses during normal conditions but with difficulty during times of crisis. Nurses tend to trust doctors and other nurses, similarly, revealing levels of trust that do not fluctuate during normal and crisis conditions.

Figure 48: Multiple perspectives on trust and communication



Perceptions regarding the team, level of support and psychological safety influence the level of trust, and the relationship between doctors and nurses are likely to impact on their level of trust towards each other and how they experience the workplace.

Additionally, because a subgroup of nurses are sticklers for bureaucracy (Figure 37, page 151), preferring to follow rules, they may struggle to adapt to situations where the rules are unclear. This may contribute to why doctors are less likely to trust and communicate with nurses during crisis situations.

7.6.2.2 Trust and internal / EC management

Those that self-identified as managers and shift leaders (Table 31) had a similar propensity to be balanced towards trusting more/blindly, rather than to not trust team members. It is considered a good sign that there are high levels of trust from the managers and shift leaders.

Table 31: Participating managers

	Doctor	**Nurse**
Manager	5	2
Shift leader	3	4
Team member	34	34

The multiple-choice question regarding the highest level of education included a question on management training. Table 32 shows that none of the doctors that participated in the study have attended any management training. The five professional nurses that attended management training courses attended management training with a duration of more than six months. There were two self-identified nurse managers that participated, thus some nurse shift leaders and/or team members had management training as well. This could be because management is often included as an additional subject for nurse specialisation courses e.g. Critical Care Nursing.

Table 32: Management training

	Management course duration and attendance	
	More than 6 months	**Shorter than 6 months**
Doctors	0	0
Nurses	5	0

Those that have done management courses were more likely to be dispersed towards the middle of the triad on the role of the managers, meaning that they probably held a more

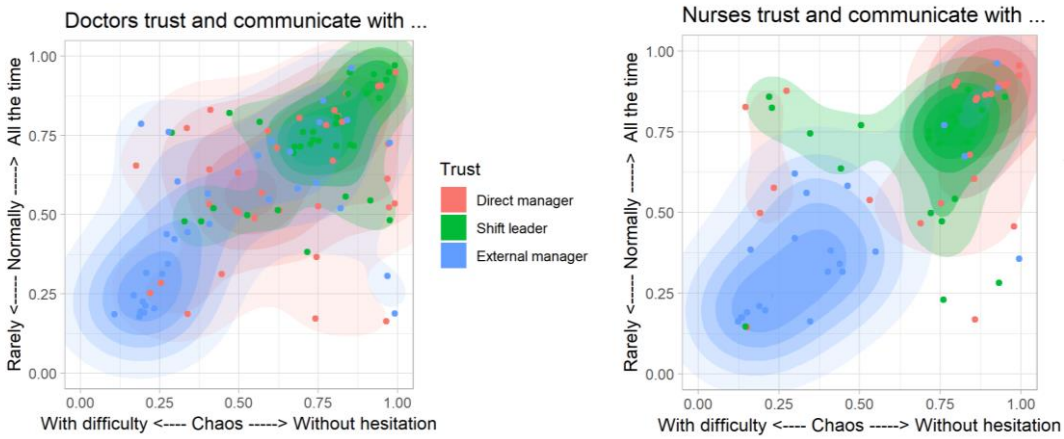
balanced view of their role, than those that have not done any management courses. This demonstrates that management training could be useful for how managers view their job.

Nurses overall indicated high levels of trust in their line manager and shift leader (Figure 49, page 167). The nurses also indicated that their level of trust and/or communication with other managers in the hospital occurred rarely and with difficulty.

The doctors seemed to trust their shift leader more than they trust their line manager or the nurses. Additionally, they indicated low levels of engagement and/or trust with the hospital's external managers.

This demonstrates a theme found in Chapter 6 where EC staff experience a disconnect with the rest of the hospital and system, and that the disconnect extends to the levels of trust and how they experience their job.

Figure 49: Multiple perspectives on trust and communication with management



That the EC team communicate rarely, and with difficulty with the hospital's external managers, is worrying. The EC team is more likely to require support and guidance from external managers after hours and over weekends when its own management team is absent. This is also when the EC is the most likely to be stretched for resources (Section 5.3.7, page 115). So, if the channels of communication are not open and reciprocal with the management team of the rest of the hospital, it is much more difficult for the EC to perform as desired.

This section on social functions established that there is a link between retrospectively feeling positive about the story told, having a longer tenure and a collaborative team attitude. Still, most participants indicated a lack of support and high levels of mistrust in the external/top management. It was noted that even though they said that they would trust

blindly (Figure 47, page 164; Figure 48, page 165 and Figure 49, page 167), it is apparent that the high level of trust does not extend to everyone and all situations.

7.7 Usefulness of SenseMaker® in this milieu

With the use of SenseMaker®, this study was able to deepen and broaden the substantive knowledge on sense-making, adaptive capability and dynamic interactions in the EC. The SenseMaker® study contributed to developing a thick study of the ECs. Healthcare typically favours carefully controlled laboratory or hypothesis-testing studies that can be generalised (18). Often, these approaches consider outcome or product over dynamics and interactions (47). Such positivist studies are deemed more scientific, despite them not capturing human complexity and viewing ambiguity, paradox and lack of clarity as constraints to overcome rather than inherent conditions. The insights gained would have been impossible if any other tool was employed. As such, SenseMaker® is highly appropriate and effective in the complex EC setting. Strengths of using SenseMaker® included:

- Its wide prompt that allowed various stories, where the depth and richness of the obtained data exceeded expectation;
- Its ability to access collective experiences and hear first-hand accounts of what really matters to people;
- Its ability merge qualitative and quantitative information, its interactive exploration and the ease of use when changing between visualisations and stories during analysis;
- Participants assign meaning to their own stories; distancing the research team from the initial interpretation and reducing bias and allowing for more objective early analysis;
- The ability to build various 'theories' into the instrument and use the most appropriate of these;
- Its ability to establish new conceptual connections between information, communication and trust networks, to name a few; and
- The ability to continue using SenseMaker® for ongoing monitoring of change

The SenseMaker® tool made it possible to shift from the conventional way of studying separate parts, e.g. doctor and nurse in isolation, to considering the systemic properties that emerged from the obscured patterns and dynamics. This is important as systemic properties are often destroyed when the parts are isolated and, in complex systems, it is the interactions

between the parts that enable functioning and generates plausible accounts that inform behaviour and other sense-making properties.

It is hard to fully appreciate and capture the less visible aspects of culture, mostly because they are so deeply ingrained that people are unaware of them. Using SenseMaker®, this study was able to go beyond the visible aspects of culture and tap into underlying shared mental frameworks and plausible stories, such as the war metaphors, in order to see how structure, systems and culture are intertwined.

Limitations of using SenseMaker® as a research tool:

- The initial investment to become proficient with the approach sets a high barrier to initial project design and requires commitment, praxis and coaching;
- It is costly to deploy;
- The design took time – it should be noted that there are ready-to-use projects, so these could potentially be employed in future studies;
- It was challenging to collect enough narratives in order to detect patterns;
- There is an aspect of vulnerability, as people's stories could be used against them, e.g. if an occurrence is recognized. SenseMaker® has processes in place such as non-sequentially presenting data, and in this study, the narratives are not included in the appendices. Nonetheless, it remains a potential weakness or vulnerability of using the tool;
- Due to the size and richness of the data set, there were many avenues to explore the descriptive data and process of sense-making was used as guideposts. Considering the data from different angles might yield other interpretations. This is not necessarily a weakness, however, when considering the appropriateness of the tool in Emergency Care, it might be deemed too abductive for those with a more positivist inclination;
- Some participants struggled with the concept of becoming a storyteller and data collection was labour-intensive; and
- The SenseMaker® software suite could benefit from including narrative analysis tools to their range.

7.8 Post-study application of the SenseMaker® data

The SenseMaker® tool is used in organisations as the first step to effect change. While this is beyond the scope and proposal of this study, it forms part of the usefulness of the tool. Therefore, it was decided to further describe the SenseMaker® praxis.

SenseMaker® is used to gain insights into the daily narratives told in organisations because the nuances of the plausible stories told can be used as drivers for change (194). By challenging some of the mental frameworks, updating language and metaphors, and influencing social structures, sense-making within and the plausible stories of the organisation can be shared and changed (15). Some of these interventions are long-term and will take time to yield impact, yet others – like the explanation below - can be implemented without delay.

SenseMaker® provides catalytic validity; its power resides in the pragmatic proof of what is working and what is not within the EC's daily practice. By asking '*what can we do today to get more stories like this and fewer like those',* the system is nudged in the direction of the preferred stories or state. The nudge occurs via a few small interventions or so-called safe-to-fail probes. Thus, interventions are based on the daily dialogue and the responsibility for implementation resides within the EC. The current dialogue and accepted stories will influence future ones. Thus, interventions are as dynamic as the system and in a perpetual state of becoming.

Section 7.5 (page 158) showed how staff in the EC communicate, and it demonstrated a breakdown in the communication pathways between the professional disciplines (Figure 42, page 158). This extended to the roles that people fulfilled in their story and there was a link between how people communicated and whether they perceived information as adequate, lacking or overwhelming (Figure 43, page 159).

In Table 33 are a few stories that involve communication and information. In the column 'Fewer stories like this' are stories demonstrating uncertainty of what is expected, not debriefing/asking for help, not supporting each other or not listening to each other. In the column 'More stories like this' demonstrates stories about co-ordinated teamwork and goodwill.

Table 33: Challenging the system by changing the daily stories

Fewer stories like this	More stories like this
We are fighting a constant battle between what we should do, and what we are supposed to do, what is expected from us, and what we can offer.	*I always feel happy when I come to work because of the EC staff.*
The trauma builds up and often the EC staff only debrief with each other and will not ask for help or counselling.	*I feel that I come here every day because of the team we have.*
Basic managerial process lacks which results in daily chaos.	*The good stuff that happens here is because of goodwill.*
Young doctors and nurses are being pounded between the rocks and waves every day, and too often just discarded and replaced when they burn out.	*The emphasis is on co-ordinated teamwork and ensuring the safety of all staff.*
The other consultants take refuge in their wards that they are trying to protect so they leave us down here with the chaos. How can it be okay for the hospital to leave us here, unassisted?	*No matter under what stressful circumstances you work, if there is teamwork, competence, staff, things will go better.*
The doctor was still not sure how to manage the patient and when our input as nurses was given, it was ignored, and we felt undermined and were put under pressure unnecessary.	*Here, I feel important and cared for; the doctors even know the nurses' names.*

7.8.1 Safe-to-fail probes

In complex environments (Section 2.9, page 38), it is impossible to predict whether an intervention will work or not; and complex situations can only be understood by interacting with them through non-causal or non-linear methods (106). Referring to the Cynefin framework (Figure 5, page 40 and Table 3, page 41), dealing with complexity requires an approach of probe-sense-respond. This means interacting via safe-to-fail probes that can be rapidly abandoned if it is sensed that it is not working or intensified if the system responds appropriately (211).

Safe-to-fail probes consist of a series of small ongoing experiments, with no targeted end-state. Instead, the focus is on finding those interactions that will move the system in the preferred direction. Although this approach may seem similar to the Plan, Do, Study, Act cycles (PDSA) often used in improvement methodology, e.g. by Lean, it differs in that PDSA cycles are more suited for complicated or obvious domains (Figure 5, page 40) where there is a relationship between cause and effect, and thus an ideal end state is possible (211).

Small daily changes combine with other small changes to create new realities. Also, because even a tiny change could have a significant and unintended consequence, testing numerous

small experiments that approach issues from different angles allow emergent possibilities to become more visible. Workable directions or solutions are then disseminated adaptively through collaborative experimentation.

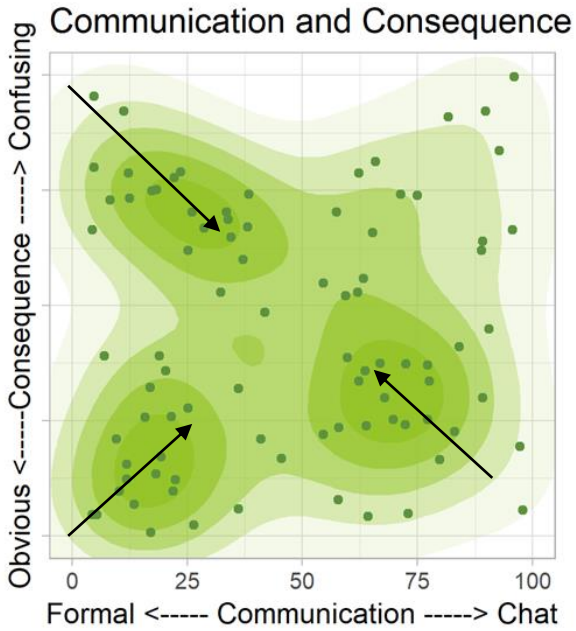
In Section 7.5 (page 158) it was identified that various communication pathways exist in the EC and that there are underlying beliefs attached regarding appropriate communication and sense-making, e.g. trust, ideology, training, stereotypes and social networks. These underlying beliefs or assumptions of what is 'right' may be so deeply ingrained that doctors and nurses in the EC might be unaware of how they contribute to communication breakdowns.

When considering Figure 45 (page 162 and repeated on page 173) three clusters are identified. Neither extreme on the axis is desirable, e.g. chatting is not indicated in all situations, nor is formalities or always following the centralised chain of command. It is idealistic to deem the consequence of all decisions as obvious. The cluster that regarded consequence of decision as obvious predominantly represent stories referring to complacency, ignoring abnormal cues, inattentional blindness or viewing consequence as 'not part of my job'. The cluster that viewed consequence as ambiguous or confusing told stories about being overwhelmed, cognitive overload and missing cues (Figure 34, page 145 and Figure 40, pages 155).

The preferred region in Figure 45 is found towards the middle. In this optimal situation, staff use or believe in using similar or a balanced mixture of communication pathways and feel that the consequence is manageable, not blatantly obvious but also not overwhelmingly confusing. The arrows demonstrate that the three clusters need to shift towards the middle. Each cluster will require different probes or interventions to facilitate this.

Addressing the different clusters in traditional cause and effect styles would entail introducing new rules, policies or algorithms on how to communicate and interact. This would be enforced from the top-down with little regard for beliefs, trust networks and ideology or practicality of implementation. Rules, policies and standard operating procedures may be suitable for situations in the obvious domain of the Cynefin framework (Figure 5, page 40), but it is unlikely to yield positive outcomes in complicated and complex domains. In fact, this type of thinking probably contributed to the complacency seen in Figure 36 (page 147). Using the SenseMaker® method to nudge the clusters towards the middle of the plot, the daily stories are considered, and the boundary spanners are identified. Boundary spanners are interventions that will allow for bridging knowledge gaps and information asymmetry while increasing relational coordination.

Figure 45: Perceived consequence of decision-making and communication style



Complex domain challenge: communication failure

There is a mismatch between how people communicate, which impacts on how they view the consequence of decisions. This extends to the roles they fulfil during situations such as decision-maker or raising the alarm and their professional roles, e.g. manager, nurse or doctor.

Potential safe-to-fail probes

Apply a mixture of safe-to-fail probes; potential probes are shown in Table 34. Some could be actionable by the operational team, others by management. Some could be naïve, e.g. adopting interventions from other industries such as aviation, while others could be direct, indirect/or designed for another reason.

Table 34: List of potential safe-to-fail probes to address different communication pathways

Nr	Potential safe-to-fail probe
1	Create a daily huddle between doctors and nurses to share operational priorities and processes
2	Increase social interaction by introducing the doctor and nurse team (including temporary staff) to each other
3	Share an information board
4	Integrate a training or feedback session
5	Draw up integrated work charts to show processes and communication pathways and display on shared boards
6	Conduct an integrated incident debrief after an operational challenge
7	Allocate one space or tearoom for doctors and nurses to socialise
8	Recognize the other discipline for their contribution to the EC/acknowledge interconnection and different purposes

Expected signs of success

Stories and signifiers that deal with communication and the consequence of decisions in the EC are closer together. This implies that people use similar communication methods and that organizational learning is taking place via reliable feedback loops and reflective learning from operational failures.

If SenseMaker® is not used for ongoing monitoring of stories, signs of success would be fewer operational failures, more social interactions and curiosity to experiment with safe-to-fail probes.

Possible signs of failure

Stories and signifiers demonstrate a bigger divide, with people feeling that the interventions are causing workarounds, instances of conflict and miscommunication. As soon as the safe-to-fail probe is not working, it is abandoned, and another probe can be tested.

7.9 Conclusion

Chapter 7 focused on the self-interpretation of the stories. The most significant patterns involving sense-making showed a disconnect between doctors and nurses that extended from information asymmetry, different underlying beliefs in what constitutes appropriate actions, different views on the consequence of actions and different perspectives regarding collaboration, trust and preferred channel of communication. Within the different categories of nurses, there was a divide in how information is viewed, that extended to preferred methods of communication and collaboration.

Storytellers that believe in collective decision-making were more likely to have a good spread of replies on their signifiers, with multiple perspectives on sense- and decision-making. These clusters provide the EC with resilience and build social cohesiveness, and it should be nurtured and purposefully amplified to strengthen the ECs operational responsiveness.

When doctor and nurse categories each hold a piece of information or knowledge, they cannot see the full picture. All that they see is their function and their reality.

The findings are important, as the system's awareness and becoming aware of the problems are associated with the ability to act on them. To deal with uncertainty, interdependent people search for meaning or cause, settle for plausibility, act and move on.

Bringing all three chapters of findings together, improving the collective sense-making could improve the adaptiveness to challenges, thereby increasing its ability to continue reliably operating during these times.

Chapter 8: Discussion

8.1 Introduction

This study set out to investigate the adaptive capability of the operational team to respond to challenges in the EC. The EC provides continuous care to patients that present without prior appointment and with varying acuities that require considerably different levels of care. Clinically the EC team must be geared to deal with any diagnoses or age patient, whilst operationally prepared to deal with variable demands on resources.

The adaptive capability was appraised from a collective sense-making stance. Adaptive capability is a dynamic system's property concerned with real-time change, and it enables an organisation to respond to equivocality. Sense-making forms a thread through the ECs organisational structure, style, routines and the stories shared; and is perceived as a precursor to enable the adaptive capability.

To answer the question 'how does the EC team make sense of the operational changes and challenges within their immediate environment', the answer is that there is little proof that interprofessional or collective sense-making occurs. Currently, the sense-making that occurs is due to the strength of the informal relationships - so-called shadow organisation - effectively implying that adapting to operational challenges occur despite of the formal structures.

> *'The good stuff that happen here is because of goodwill… But you can't just take, you have to give, because there is a limit to goodwill'*
>
> *Story title: Give and take (Narrative 44)*

8.2 Main Findings

The introductory statements made are elaborated on throughout the rest of the chapter. The clarification of who belongs to the EC team and the dynamics between the professions are ambiguous. This is probably the result of, and results in, the prevailing mental frameworks of acting out a war. The war is fuelled by another operational disconnect, this time between the EC and the rest of the hospital. Overall, the ECs are 'diagnosed' as stressed institutions, with limited sense-making and adaptive capabilities. A model for improving adaptive capability is proposed, and how this would enhance interprofessional sense-making is briefly discussed.

8.2.1 Ambiguity regarding interprofessional team dynamics

A study objective was to investigate interprofessional team dynamics, and even though the participants identified with being part of the interprofessional team, the level of collaboration and trust in and between the professions fluctuates depending on the situation.

Discrepancies in the levels of reciprocal collaboration were seen in:

- Disparate answers on when and how to share information and knowledge (Figure 31, page 141);
- Separate views regarding communication, with the disjoint more pronounced during crises (Figure 42, page 158 and Figure 48, page 165);
- Formal structures dividing the ECs interprofessional team (Figure 8, page 94);
- Inconsistent application of hospital rules (Section 5.3, page 96);
- EC nurses have militaristic hierarchies with command-and-control systems, whilst the doctors generally adopt laissez-faire attitudes to control (Sections 5.2.3 and 5.2.4, page 95);
- Separate social spaces that reduce the opportunities for the interprofessional team to interact and share insights (Section 5.3.6, page 110); and
- The prevalence of us-versus-them mentalities in the narratives (Section 6.4.2, page 124).

There exist ample individual technical capabilities, expertise and cognitive competence to meet operational needs in the EC, yet there is a lack of collaborative and coherent sense-making. This appears especially true for critical operational problems e.g. access block, crowding and resource constraints. The breakdown between team members is evident in assumptions about how to communicate (Figure 42, page 158), what informs the pressure to act (Figure 38, page 152) and how the consequence of decisions is viewed (Figure 39, page 153). There is also the problem of policies describing the roles and responsibilities of another discipline, yet not including them in the dissemination of the policy (Figures 13 and 14, page 104). Adaptive capability and collective sense-making are team proficiencies, and operational efficiency is vested in patterns of interaction as opposed to individual behaviour (40).

To deal with the challenges in the EC, it is important to move beyond individual competency and towards building interprofessional team competencies. Doctors and nurses are socialised into expected sense-making activities, with cognitive, normative and regulatory forces shaping their professional identities. The prevailing bureaucratic structures found in

South African hospitals encourage vertical communication within discipline-specific hierarchies, whilst discouraging horizontal interaction i.e. interprofessional communication. This organisational structure inherently undermines interprofessional sense-making (7).

Perhaps interprofessional sense-making is of less importance in steady-state ward settings that has a predictable patient mix, patient numbers and patient arrivals; or in settings where healthcare professionals can fulfil their functions in isolation (Section 2.8.1, page 33). This description does not apply to the dynamic EC that is characterised by high variability of patient arrivals, patient mix, time-critical decisions and unpredictable workloads (Chapter 3). The ability to tap into multiple perspectives and collaborate horizontally are crucial in dynamic environments and it should be expressed in the operational structures (26). Attempts to fit the EC into an unsuitable traditional bureaucracy contributes to the diagnosis of the ECs as stressed and potentially perpetuates the operational failures (Section 8.2, page 176).

> *'The roles of doctors and nurses have merged in order for us to deal with nursing shortages*' (*Narrative 6)*

The debilitating formal team structure is exacerbated by fuzzy boundaries where there are overlaps and duplications in some structures. For example, separate policies to deal with the same operational issue e.g. dealing with access block (in parallel), yet simultaneously there are gaping voids in accountabilities, such as who deals with the overflow in the waiting room or with complaints from patients and visitors. The job descriptions provide little clarity, as these are mostly generic without specifically addressing EC job routines or responsibilities (Section 5.2.3, page 95).

Role confusion and boundary-blurring increase the risk of missing cues, not knowing/following the rules, and potentially not feeling psychologically safe in the workplace; all contributing to the 'socially constructed war' that is raging in the ECs.

Information asymmetry

Each professional group has its own way of organising information - expectations about content, the structure of sharing and timing of information transfers (Section 7.2, page 140)(95). It is made visible in the organisational structure - including the formal rules to share information via the chain of command - and operational decision-making takes place outside of the EC (Section 5.2, page 93). Technology is not being universally integrated, and electronic data not made available to everyone (Section 5.3.1.3, page 101).

It was observed that following interventions, people would disperse to their discipline-specific desk to do paperwork, often talking with others at the desk about what they just did, their concerns and other EC-related issues (Section 5.2.4, page 95 and Section 5.3, page 96). The information shared casually within a group would often be applicable – and even vital – to the other discipline e.g. changing a treatment plan or finding fault with life-saving equipment. As seen in Figure 11 (page 100) the gaps created in the patient and document flow creates risks for clinical failure and/or patient adverse events.

Information asymmetry perpetuates a mismatch between those holding relevant information and those requiring the information to make sense. The risk is that it gives way to monopolies of knowledge that could be used to compete with, manipulate or obstruct others in the workplace. Seeing that the current formal structure creates a climate where doctors and nurses vie for resources, this is a likely scenario in the EC, and it might contribute to the mental frame of being at war.

Lack of feedback and communication methods

Poor communication and/or lacking feedback loops has been identified as common causes of systems failures (21). During undergraduate healthcare education, the communication skills generally taught focusses on interactions with the patient, with little attention given to interacting within a team or with other professionals (102). This is probably causal to some of the interprofessional barriers to effective communication found in this study.

Doctors and nurses use different methods of communication, with doctors preferring informal methods and nurses sticking to formalities (Figure 39, page 153 and Figure 42, page 158). These differences in approaching communication could incite conflict, e.g. the doctor chatting about what the situation ideally requires, while the nurse expects a formal order based on the rules. Because the nurse is not 'participating' in the conversation, the doctor may perceive the nurse as obstructive. On the other hand, the nurse may feel uncertain because the rules are unclear, and the doctor is not following those rules as is.

The disconnect is exacerbated by a variety of strategic visions, objectives, chains of command and mismatched job descriptions (Section 5.2, page 93 and Section 5.3.6, page 110). Evidence of the divide continued throughout Chapters 5, 6 and 7, demonstrating deeply engrained separation in communication, operations and feedback. Functioning and communicating in parallel as two operational units within one unit presents a major weakness for sense-making and counters attempts at efficient operations.

When failures occur, each discipline does its own investigation, considering discipline-specific situational factors that contributed to the incident. The subsequent improvements are generally contained within the silo; ignoring deeper systemic causes. Addressing process issues, like communication failures within silos; fail to sufficiently address and solve whole-system issues, thus potentially leading to further unintended failures within the overall system (93, 101).

The process of handover requires special mention. The difficulties in handover in healthcare are well-described, and it remains unsolved in the literature (56). The doctors and nurses have separate handovers staggered at different times. Operations continue throughout handover, making interruptions frequent and resulting in information being outdated as it is transmitted.

There are no feedback mechanisms in place between the disciplinary handovers, thus trapping updated (and other) information within each discipline. This seems highly ineffective, and should they develop feedback mechanisms to share information between the handovers it could increase the local knowledge. It was noted that most people relied on memory, with limited notetaking during handover. Relying solely on the verbal transmission might increase the information loss (Table 6, page 96 and Table 7, page 97).

When knowledge sharing is contained within a discipline, a single-track mental frame surfaces where those in the silo only notice what they are conditioned to see and allowed to act on. The combination of disjointed information-processing, weak interprofessional communication and a lack of feedback channels impedes effective sense-making.

8.2.2 Mental frames and the terminology used

> *'Understanding these challenges and responding to them will differ from person to person in a way it feels like something that can only be learned through experience' (Narrative 14)*

Language is symbolic, reflecting the everyday reality, and groups often use metaphors to express communal reasoning. Capturing these provide insight into the widely held generic mental frameworks or 'theories in use' that informs the behaviours (Section 2.2.2, page14 and Section 2.9, page 38) (115).

The people in the EC are unable to apply discretionary decision-making models and are stuck in a collective heuristic and mental frame of applying figurative Band-Aids whilst battling a war. This was seen throughout, yet was particularly clear in Tables 14, 15, 16 (pages 122, 126 and 126) and Figures 27 and 37 (pages 124 and 151).

'We are fighting a constant battle between what we should do, and what we are supposed to do; what is expected from us, and what we can offer' (Narrative 6)

The daily work reality was constructed as a war zone. During times of war, information and knowledge are protected, and isolation occurs, resulting in mistrust towards those outside of one's immediate group. War is characterised by destruction, and the opposite of a war like this is not peace. The opposite is creation – synergy, innovation and upliftment.

Even though the use of war metaphors and explosive words were frequent in the stories told, those in the EC may remain unaware of the war-like tactics they are displaying. By addressing the war terminology, aspects of hostility and defensiveness could be overcome. Shifting the terminology towards the opposite (creation, synergy, innovation) would enable the EC to shift the focus towards solving systemic issues as opposed to focussing on self-protection and survival.

It is deduced that the operational disconnect between the EC and the rest of the hospital is a causal factor to the 'war', compounded by inefficient internal communication channels and stereotypical bureaucratic identities. This was best captured in the stories that suggested passive-aggressive behaviour in the form of obstruction, which is an underlying mechanism of frustration often employed as a covert anger tactic (212).

'We are almost constantly in a reactive condition-black like state, where we have very little reserves left to tackle pro-active initiatives that may provide solutions for our problems rather than just barely coping with them' (Narrative 16)

Not only are they at war, but the EC team are also absorbed in their current situation or a continuity of situations, with no forward vision or retrospective reflections. They are so consumed in the 'now', that they are unable to look beyond whatever situation they are currently dealing with (Figure 27, page 124).

Few problems are definitively solved, and team members may confront the same frustrating inefficiencies every day for years or until catastrophe results. This type of 'now-focus' elicits workarounds, i.e. quickly fixing what's wrong now, with the purpose of moving forward, as opposed to taking time to solve deeper systemic causes and to prevent reoccurrence or catastrophic failure (93).

'Constant turnover, new information, putting out fires, being excellent with a smile on your face despite the stress' (*Narrative 12)*

There is an underlying heuristic where some in the EC blindly accept information, even when mismatches or inconsistencies exist between information and possible explanation (Figure 37, page 151). This could imply a lack of comprehension and, combined with poor feedback loops and disjointed communication patterns, could result in a disconnection between those who have the information and those who understand its significance (45).

This reactive, rather than proactive stance could be another symptom of the mentality of moving from one-short term fixing of a problem to the next (61). The consequence of such behaviours and the incubation of latent errors means that systemic concerns remain unresolved (26).

8.2.3 Breakdown with external stakeholders

> *'We have hospital issues that manifest in the EC, it is not actually an EC issue, but the hospital has made it into a pure EC issue' (Narrative 66)*

In scrutinising a system and attempting to understand its deepest malfunctions, attention needs to be paid to the rules, structures and ways in which power is displayed (21). Hospital decision-makers must be aware of how unsustainable EC conditions are, how work pressure takes its toll on EC staff, and that the situation is not conducive to quality patient care or outcomes. Yet, it may suit them and the rest of the hospital to keep the EC system malfunctioning in this way.

The situation is allowed because the rest of the hospital is shielded by the EC by constraining issues like psychiatric patients, boarders and access block to the EC. Its consensual neglect leads to widespread feelings of perceived injustice to the staff in the EC - with them feeling helpless and frustrated - and it puts these staff members at risk of burnout, emotional distress and error (61). Studies on organisational justice suggest that perceptions of unfair treatment lead to tension, conflict and non-collaboration (212). This explains the general distrust in managers and the negative emotional tone experienced when telling stories about systems issues (Figure 25, page 122; Table 14, page 122 and Figure 49, page 167).

> *'We have a crisis and then they have meetings suggesting long-term plans, but nothing is done for the crisis; we have good relationships with management, but we need more than good relationships – we need leadership, we need management to take responsibility. Somebody needs to stand-up and do more than just another meeting*' (*Narrative 66)*

The rest of the health system including the hospitals have made the EC into a safety net, relying on the ECs workforce to compensate for their working hours. For example, primary healthcare centres are open during office hours, and patients are advised to access their closest EC should the need arise after office hours. In the hospital, essential services e.g. radiology, pharmacy and occupational health shut down 'after hours' and it is expected that the EC will render essential duties e.g. managing the after-hours pharmacy cupboard. The EC experiences a surge in patient numbers in the evening and on weekends i.e. 'after hours'. Absorbing these additional duties might exacerbate the challenges of dealing with demand, threatening patient safety and adding additional strain to the EC team (Section 5.3.7, page 115) (35, 101).

8.2.4 Stressed and traumatised ECs

> '*I lie awake at night and have flashbacks and nightmares about the EC and the inequity of our care' (Narrative 70)*

Organisations are like people. They have an identity, beliefs and specific ways of doing things. And like people, organisations can become stressed, overwhelmed and angry. Consistent with Van Holdt's studies on a selection of South African public hospitals, this study shows that the ECs selected are stressed (94). Dysfunctional stressed organisations have underlying and unaddressed (even undiagnosed) systemic issues, where agents feel overwhelmed and grapple with the workload. Some of these systemic issues e.g. internal strength to make sense and deal with emergence, may not be visible when studying the isolated components of the EC, only becoming visible when studying the EC as CAS (Section 2.9.3, page 46).

Constantly operating beyond capacity in crisis mode, while temporary solutions are applied to long-term and systemic issues, does not make the EC adaptive to respond to its daily challenges (59). In their words, EC staff are caught up in a war and are utterly stuck in the 'now', unable to see beyond their daily challenges (Figure 27, page 124 and Figure 28, page 127). Their stories suggested they feel disempowered to respond appropriately to operational challenges.

One of the most pressing operational challenges is dealing with crowding whilst trying to make sense when the EC is operating at 270 -370% capacity (134). Regardless of the pressure and demand of operating beyond capacity, the resources remain fixed. That the EC staff are aware of the 'injustice' was seen in e.g. Table 18 (page 129) that gives an overview of stories told about the breakdown, whilst Figure 48 (page 165) demonstrates the disintegration in trust in managers external to the EC.

Other than the relationships externally, constantly coping in such a stressful environment of demand/supply mismatch probably contributes to sense-making failures in the EC (Section 2.5.4, page 21). This type of environment is harmful to the individual, leading to negative emotions, increasing the risk of burnout, not collaborating, not feeling able to express themselves and not noticing emergence (4, 42, 49). It is possible that the attitude of non-cooperation due to environmental factors are contributory to telling the new colleague that they should jump in without guidance or support (Table 23, page 137).

8.2.5 Adaptiveness and learning

The challenges mentioned in narratives e.g. crowding and resource constraints are recurring and widely acknowledged in literature (Chapter 3). None of the stories told in this study was entirely unique, implying the presence of repeatable events. Yet, only a few storytellers indicated that they tapped into these past experiences of what worked in order to meet current challenges (Figure 37, page 151).

Most people treated every situation (regardless of the frequency of occurrence) as novel; whilst the rest blindly followed the rules, regardless of the appropriateness of the rules in the given situation. The nurses might be blindly following the rules because they believe they will be punished if they do not yet, appeared unsure as to what the rules and their accountabilities are. This adds a layer of complexity when responding to operational demands.

Neither is ideal, and pliancy is required between blindly following rules and treating each situation as novel. This again demonstrates the existence of two ECs running in parallel in each unit. Another interpretation is that the storytellers are too busy applying figurative Band-Aids to do reflection or think of resolving challenges for the way forward. Thus, there is no scope for sharing reflections or communicating whilst they are stuck in a mode of only fixing a problem enough to continue to the next (Figures 27, page 124 and Tables 14, 15, 16, pages 122 and 126).

The lack of learning hampers the ability of the EC to identify and resolve recurring systemic problems, and ‘move forward’. Furthermore, it is impacted by investigations and improvements generally being managed within the silo, without addressing whole-system issues. The adaptive capability can be improved by implementing ‘lessons’ learnt, strengthening feedback loops, and establishing accepted communication methods across the boundaries (86).

The EC Management

'…. the frustration with essentially running two services in the EC is amplified by the fact that I do not have control over it. The EC overcrowding is a manifestation of a hospital problem and I do not have direct control over in-hospital team processes. The inequitable distribution of overcrowding (a ward will go to 100% then they refuse to take more patients, but the EC can never refuse) and risk to the EC for what is essentially a systems and hospital problem is not fair, and exacts a heavy toll on my teams' (Narrative 16)

Managers are expected to take on a broader perspective, fulfilling the role of negotiator and forming a buffer between the EC and external stakeholders. The gaps in communication methods, instances of information asymmetry and relationship breakdowns with the rest of the hospital suggest that EC managers either lack insight into operational challenges, or are disempowered from wielding influence, or a combination of the two.

Incoherent management practices disregard the importance of aligned direction (Section 2.8, page 32). Management subtly signals that horizontal collaboration is not required by the different vision statements, policies, procedures and discipline-specific notice boards (Figure 8 and 9, page 94 and Figure 20, page 114). These signals convey exclusivity to those belonging to a group that extends into their social spaces, such as in-service learning opportunities and tea rooms usage. Management control how and when knowledge is shared or withheld from operational teams, e.g. keeping policies under lock and key, sharing information from centralised structures, etc.

Generally, managements' orientation towards interprofessional collaboration will impact the level of collaboration. There cannot be a climate of collaboration, and interprofessional sense-making if the EC managers are signalling a divide and/or mixed messages where what they say and what their policies say are not aligned (100). The message that horizontal collaboration is not required is not intentional, and it is engrained in how hospitals are traditionally structured.

8.3 Other findings

The nursing conundrum

'Nurses are the most vulnerable people in the hospital system, and yet they are the biggest issues with their traditional thinking and dictators at top hierarchy' (Narrative 68)

As discussed earlier (Section 5.3.6, page 110), emergency nursing is internationally recognised as a highly trained post-graduate professional nurse speciality, yet in this study, the nursing cadre was mostly made up of lower-category nurses (Figure 19, page 113). This is problematic for several reasons. The high variability in the EC, patient mix, physical layout and constantly operating beyond maximum capacity require nurses with critical problem-solving skills and that can practice independently.

Lower-category nurses are supposed to deliver basic nursing care under the direct or indirect supervision of professional nurses. If they are practising within their permitted scope, the predominance of lower-category nurses does not allow for the required independent nursing practice and critical problem-solving skills that the EC clearly needs.

The EC nurses are continually shifting between rendering ward-based nursing care according to ward routines, as well as responding to emergency care cases (Section 5.3.4, page 104). This carries a cognitive load and increases the complexity of the EC nurses role.

Studies on patient safety suggest that the number, qualification and skill level of nurses affect their ability to sense safety risks (156). These and other studies have stated that nurses (i.e. all categories are assumed here) are unlikely to voice opinions in multidisciplinary environments and they are likely to conform even if they disagree with a decision; this was found to be true even in life-threatening situations (70).

There is a wide range of possible reasons for this e.g. reverence of those in power positions prevents people from speaking up, thereby creating a risk that those lower in the hierarchy become over-reliant on higher status roles and may abdicate their responsibility to notice or speak up about discrepancies. In the nurses' stories there was evidence of espoused beliefs regarding positional power that appears to correlate with a belief in formal communication (Figure 42, page 158).

To add to the findings that nurses will not speak up, this study showed that the problems, especially within the nursing categories, might start with information-processing, and the lower-category nurses were most likely to feel overwhelmed by information (Figure 31, page 141). They were also the most likely group of nurses to accept information without question, even when it did not fit the situation. Studies show that when people are willing to passively receive information without questioning anything, they are less likely to notice emergent problems (11).

Further, due to their status in the nursing hierarchy, the lower-category nurses may not deem it ‘their job’ to investigate or report abnormalities. And/or they may be prohibited from

negotiating and resolving issues with higher-category nurses – especially those external to the EC – hence they feel unsupported within and by the system (93).

Even though the participation of lower-category nurses in the SenseMaker® survey was too small to make conclusive deductions, the findings in combination with the above-mentioned literature support a notion that lower-category nurses may not be coping with the cognitive load of the ECs.

Another concerning finding was the nursing staffing levels. The levels are fixed, with no adjustment according to need or acuity of patients in the EC. The doctors had consistent staffing levels across the ECs, yet the nursing mix and levels fluctuated greatly between the units (Table 12, page 111 and Figure 18, page 112). None of the ECs nursing managers was able to produce guidelines on the established minimum nursing staffing levels. This is important, as the number, competency and efficacy of the nurses determine the ability of a hospital ward to render quality and safe care (142, 156).

Lack of induction

> '*We are told to just ask the nurses if we have any issues or have to know anything'* (*Narrative 22)*
>
> *'There is no time to orient new people, you must know what's going on to work here, and must be clear about what you are doing' (Narrative 69)*

People are more likely to ask for help, raise concerns or question actions with those that they share a social connection with (13). This might not be the best-equipped person to solve a problem or be in line with the organisation's formal reporting structures.

When newcomers arrive at the workplace, they are supposed to be socialised into the acceptable rules and behaviours in the workplace; yet this seems to happen in a haphazard way in the ECs. Doctors are told to 'ask the nurses' and even though the nurses undergo a hospital orientation, evidence that they received an EC orientation was lacking. Doctors and nurses with less than 6 months tenure selected that they wanted to do the right thing and expected guidance, rather than support or resources from their managers (Figure 39, page 153). How this links to social connection was seen in the findings that linked longer tenure in the EC with higher levels of trust and positive feelings about the story they told (Section 7.6, page 162).

Not being oriented to the workplace and expectations may further contribute to them treating all situations as novel – as there is no organisational memory of how to manage certain situations.

8.4 The adaptive capability of the EC team

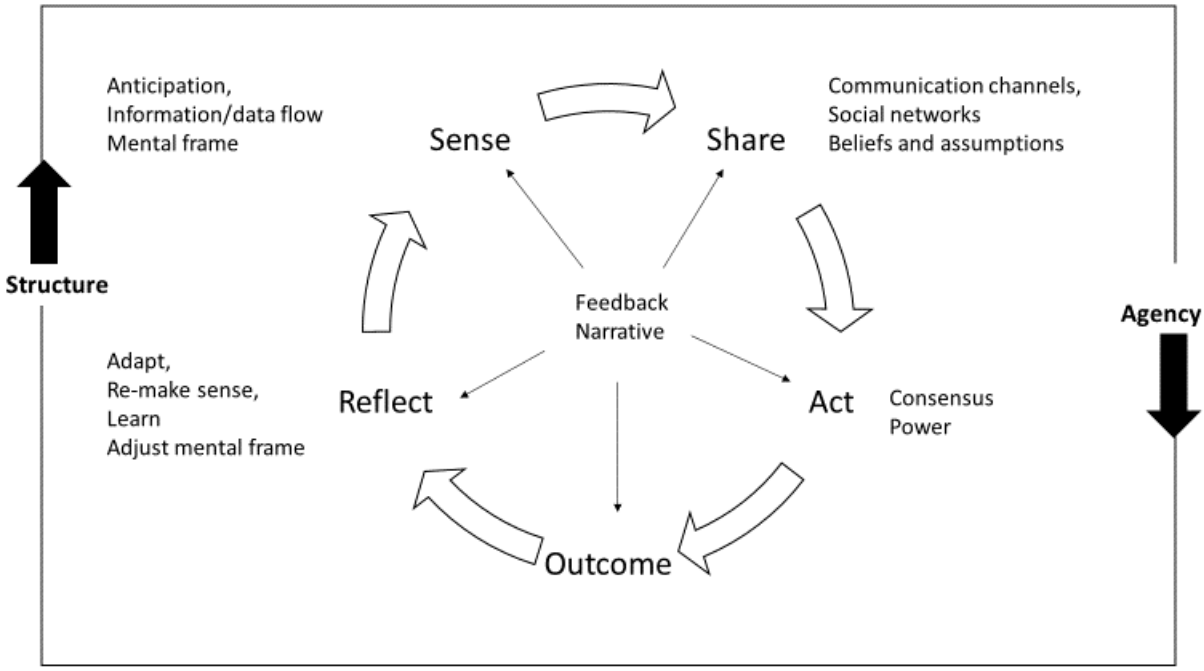
Sense-making is a dynamic collective process, situated in the social structures of the EC, and it should be enabled by the formal structures. To make sense, the team needs the ability to anticipate change, notice change, access to the relevant information, and the ability to respond. Team members are more likely to share information with those they know and trust, and whom they communicate with will influence sense-making.

This is further influenced by the communication channel and direction of communication (horizontal or vertical). The response changes the situation, making feedback crucial, as it helps to update their knowledge (and response) on a situation, and it enables future learning.

Sense-making and adapting to the sense made requires 'freedom' to act within the EC's rules and resources. From a team perspective, it further requires the ability to share information, reach consensus and have the power to act based on the situation and the consensus reached.

Figure 50 demonstrates an ideal model for sense-making in the EC. The model was conceptualised from the literature on sense-making and team adaptive capabilities (Section 2.5, page 18 and Section 2.10, page 46).

Figure 50: Adaptive capability and sense-making: an ideal model for the EC



The outside border of Figure 51 demonstrates the duality of structure and agency. Neither is static, and structure is slower in adapting to change.

Sense

Sense-making starts with anticipating change - paying attention to the information or data flow, with an 'open' or 'questioning' mental frame. Even though it could be argued that sensing is an individual capability, the ability to complete a sense-making cycle in the EC is influenced by 'collective' attributes such as shared professional identity, policies, collective mental frames etc.

Share

Newly bracketed information is shared across the boundaries, this requires receptive cross-boundary communication channels (formally) and social networks (informally).

Act

Actions include reaching consensus, keeping quiet, speaking up, or any other method used to 'bridge-the-gap' (Section 2.5.5, page 23).

Outcome

Every action result in a change in the situation. The outcome may be the desired one, it could be unintended, or there could be more than one outcome.

Reflect

To close the loop and ensure sense-making, organisational learning, and address systemic errors, there should be an opportunity to reflect. The ability to reflect and establish links between cues, action and consequence is considered vital in order to develop expertise (Section 2.7.3, page 30).

Narrative and feedback

Each step in the Sense-Share-Act-Outcome-Reflect cycle is enabled due to narrative and feedback loops between the parts of the cycle. These two words were placed in the middle of the model to demonstrate that it is central to the process of collective sense-making and that the dialogue assists the sense-makers to continuously structure and restructure 'reality', 'truth' and 'knowledge' (54). It further illustrates that sense-making is simultaneously situational, yet transitional (Section 2.2.2, page 14) (36).

Current situation

Currently, the sense-making cycle (Figure 50) occurs in isolated pockets in the EC, with breakdowns in every step of the cycle. The divide in interprofessional sense-making surfaced throughout the findings and are perpetuated by the formal hospital structures and professional identity, and are deeply rooted in how healthcare professionals are educated.

That doctors and nurses prioritizes different cues, and act in different ways because of their multiple perspectives is not the problem. Rather, the problem is the lack of utilising these perspectives to improve the operational effectiveness of the EC. Obtaining common ground would improve the ability of the EC team to be responsive to the variability of their environment.

Having agents acting in isolation within the confines of a single discipline results in the mentality of either treating every situation as novel, or blindly sticking to rules. When doctors and nurses do attempt to collaborate, they access different organisational structures, rules and information sources, followed by applying different communication channels. Not only does this potentiate operational and communication failures, it probably contributes to their expressions of frustration, wide-spread use of war terminology and almost certainly affects the quality of safe patient care.

Towards an interprofessional model of sense-making in the EC

Adaptive capability of organisations is situated at an operational level (3). To improve the adaptive capability of the EC, improved sense-making processes are required. This can be

done in several ways, firstly the environment mandates 'central' information exchanges incorporating diverse perspectives. Then, communication systems should be redesigned to be responsive to the requirements of the EC environment. This could enhance the current sense-making repertoires.

Even though the EC is a unique operational setting, it cannot completely distance itself from hospital operations and that transitions in care from the EC to other hospital areas should seem seamless to the patient. Interventions need to be carefully crafted, considering that the EC system is embedded within a larger hospital system and that even minor changes within the structures will have unintentional consequences on the functioning of the rest of the hospital system.

Thus, it is proposed that the EC positions itself as a relational bureaucracy – a hybrid of relational and bureaucratic structures, with integration occurring via formal structures specifically designed for reciprocal horizontal relationships (14). It could retain bureaucratic structures, adding integrated relational methods for knowledge management that pertains to information, communication and feedback. This would enable the EC to deal with its inherent ambiguity, whilst at the same time maintaining key hospital bureaucratic structures (96).

Communication should be based on interdependent and integrated knowledge. This can be achieved by determining shared goals and integrating policy and procedure to be EC specific combining doctors and nurses (14, 35). Sharing one vision for the EC would provide a superordinate direction that will help the team reach the common ground again and again. Interprofessional communication can be built-in to allow relevant information to be shared frequently, timely, accurately and sent via focused channels. Knowledge exists in patterned behaviours, such as how information is dealt with and interventions to improve sense-making and reciprocity should be aimed at patterned behaviours, team behaviours and networks, as opposed to targeting interpersonal relationships (95, 101).

This focus on team processes, as opposed to individual practitioners, could challenge some of the deeply held divides between the professions. Again, interventions need to be sensitive to the hospital system, as well as professional stereotypes. The leverage points in complex systems are the places where a tiny shift may produce big changes. Such EC leverage points can be exploited by experimenting with small daily shifts in information management, communication methods and social cohesion.

The method of using small interventions, called safe-to-fail probes can help to test the readiness of the EC system to adjust. It is frequently used as part of the SenseMaker® tool

and the National Health Services (NHS) in the United Kingdom advocates the use of safe-to-fail probes for improvement (Section7.8, page 171)(211).

Organising the EC around functional specialities fundamentally limits integrated operational functioning. The result is a dearth of opportunities for social cohesion, which confounds the ECs purpose. Despite horizontal collaboration being constrained by the bureaucratic structure and stereotypical identities held by some, it is evident that informally they are crossing the formal boundaries to cooperate.

Shifting the bureaucratic structure, even redesigning it to a relational bureaucracy will take time. In the meantime tapping into the informal or social relationships and strengthening these could help the EC team to become more capable of dealing with the dynamic environment; volatile, uncertain, ambiguous and complex as it is (15, 81).

8.5 Conclusion

With the growing demand on the ECs in the Western Cape (Figure 12, page 102) and ever-present budgetary constraints, ECs require new strategies to cope with the demand. In the Western Cape and South Africa, Emergency Centre (and care) systems are still developing. The current operating structures and methods are inherited from the rest of the hospital, and from how outpatient/casualty units were managed prior to recognising the need for this space of the hospital to be a specialised area.

When doctor and nurse categories each hold a piece of information or knowledge, they cannot see the full picture. All that they can see is their function and reality. Instead of the existing parallel sense-making and problem-solving practises, diverse perspectives and varied experiences should be cultivated, thereby building interdependent feedback loops. This has been proven to lead to better sense-making in complex environments and has been shown to sufficiently address systemic issues (59).

To move towards an interprofessional sense-making model, the EC as a system could reposition itself as relational bureaucracies within the current health system. Additionally, individual ECs could use safe-to-fail probes to experiment with ways of improving information processing and communication methods.

Chapter 9: Overall conclusions and recommendations

9.1 Introduction

This study considered the adaptive capability of the EC operational team to respond to the daily challenges. The study was done from a sense-making perspective. Sense-making is seen as a precursor to adaptive capability, i.e. the ability of the interprofessional EC team, to respond to emergence whilst continuing operations.

It is an opportune time for a study like this: emergency medicine is still a developing medical speciality in South Africa, while emergency nursing is not yet recognised as a nursing speciality. This means that the field of emergency care is established enough to have generated plausible stories, yet still new enough to mould.

This study set out to determine collective or interprofessional sense-making in the EC. The explorative study identified gaps in the information-processing capabilities, communication methods, and the disjoint between formal and informal structures was brought to the forefront. This extends between and within the professional groups, adversely impacting the sense-making capabilities of the EC team. The disconnect leads to disjointed attempts to respond to emergence, probably aggravating the failures within the system.

Chapter 9 shares the empirical, methodological and theoretical contributions of this study, offers recommendations based on the findings and puts forward potential further research building from this study.

9.2. Contributions of this study

9.2.1 Empirical contribution

This study, which is the first of its kind in South African ECs, considered the phenomenon of sense-making by studying the dynamics between doctors and nurses. The study generates new knowledge in a few ways, firstly most studies on ECs are discipline-specific and/or focused on a singled-out process-condition e.g. handover. Secondly, the study uncovered that the ECs studied has a limited capacity to sense and adapt to emergence. This despite the ECs core purpose of dealing with variable emergency medical cases.

Deeply held divisive assumptions between doctors and nurses were uncovered, that is aggravated because of the muddled communication, limited social interaction and lack information-sharing. This creates a situation where doctors and nurses in the EC attend to the same patients within the same four walls whilst competing for the same resources and

making silo-based decisions. These silo-based decisions often originate externally from the top hierarchies within the disciplines and might not be appropriate to the current condition. The literature on interprofessional teamwork often focuses on reciprocity, collaboration etc. However, there are limited studies that describe the impact of hospital organisational structure, strategy, style and systems on the interprofessional teamwork.

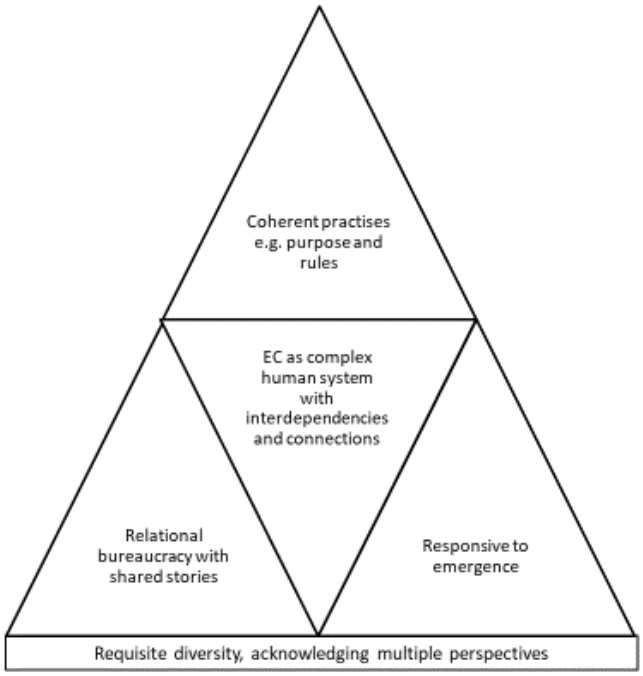
9.2.2 Theoretical contribution

Chapters 6 and 7 were designed and analysed according to the process of sense-making described by Weick, Sutcliffe and Obstfeld. The sense-making perspectives of Dervin and Klein were interwoven into the process and combined with a narrative-based inquiry (Section 2.2, page 10 and Section 2.5, page 18).

When used in organisational research, narrative inquiry is predominantly used in five main areas, including sense-making, communication, ideology, organisational learning and identity (34). This study provided new theoretical contributions to how sense-making occurs within a dynamic interprofessional healthcare setting, the EC. The synthesis of the sense-making perspectives into one process is another theoretical contribution to sense-making.

From the knowledge gained, a model for collective (interprofessional) sense-making in the EC was developed. The key empirical and theoretical contributions of this study and the insights gained could be used to improve adaptive capability (Figure 51).

Figure 51: Enabling adaptive capability in the EC



9.2.3 Methodological contribution

Sense-making has been directly tied to organisational behaviour and the generation of organisational knowledge. The most basic sense-making method is the stories and language used in the workplace. This study combined the theoretical construct of the process of sense-making with a narrative-capturing sense-making tool to determine how the EC team makes sense. The study contributes to the methodological knowledge by triangulating the SenseMaker® findings with the descriptive study and doing a narrative analysis. Typically, in SenseMaker® studies the narratives are not analysed separately.

9.3 Limitations

The study was broad, and the richness of the data set was more than what could be fully utilised and not all the findings could be explored.

In the proposal, the study intended to organise a learning clinic post-data collection in which the findings from the self-interpretation data could be explored with the storytellers. This was not pursued due to logistical problems such as requesting EC staff to participate on a rest day. It would have required storytellers from all the participating hospitals, and all categories of staff, to be represented at a one-day workshop. Not having a participative workshop may limit some of the interpretations.

Even though the EC is acknowledged as part of the bigger system, the boundaries were drawn to isolate the EC doctors and nurses. This excluded the rest of the hospital, and more importantly other groups that work in the EC, which limits other perspectives that could have been important, e.g. the opinions of porters and administrative staff. Multiteam or considering sense-making within a whole hospital would have added different findings.

Other limitations on interpretation include stance, such as exploring the data set with a critico-ideological stance to explore EC power plays, which would have yielded different discussion points.

The study considered the overall process of sense-making and excluded sociological variables e.g. race and gender. Sociological variables will influence individual sense-making, and as this study considered collective sense-making, it was decided to focus on team factors rather than static demographic factors as the findings might have distracted the attention from the dynamic factors that this study attempts to uncover (20).

The theoretical construct used for the SenseMaker® study did not allow for a deep dive into the multiple dimensions of culture. To counter the limitation, other studies on

interprofessional relationships were used to inform interpretations, especially those on nurse communication.

Clinical decision-making was not included, and a similar study considering clinical sense-making could potentially be valuable.

A bigger number of participants would have strengthened patterns and findings. Having more lower-category nurses participate would have helped to unpack the apparent nursing conundrum more.

9.4 Recommendations

The recommendations are summarised under two main headings. The first is to reposition and renegotiate the EC, the second is to strengthen interprofessional learning within the EC. Within each of these, some sub-headings were added.

9.4.1 Renegotiating and repositioning the EC

The EC is fundamentally different from the rest of the hospital, and a shift in the perspectives of how the ECs are utilised within the hospitals are required. It is recommended that the rest of the hospital alter the levels of support they currently offer their ECs. This type of negotiating and repositioning of the EC should be advocated for internally and externally by policy makers.

Internal repositioning

As discussed in Chapter 8, the possibility of redesigning the EC structure to that of a relational bureaucracy should be considered. Repositioning includes addressing internal structural discrepancies, e.g. mismatched strategic objectives, generic job descriptions etc. The EC job descriptions should be developed to be more specific to and aligned with EC performance indicators. Specific job descriptions would reduce role confusion and, ambiguous accountabilities; it would also assist with identifying appropriate topics for in-service training. Strategically, developing shared strategic direction by endorsing a coherent vision, communication method and outcomes for the ECs would align the EC team and the EC in general's ability to meet its purpose.

Professional identity versus team identity

The two disciplines are vying against each other, and each profession has developed its own EC identity. By challenging the two EC professional identities to develop one team identity,

the adaptive capability of the EC could be strengthened. To illustrate what is meant by team identity, one could think of a sports team where the team members identify with being part of the team, e.g. a rugby team, as opposed to overly identifying with their position in the team.

One way to subtly convey the idea of 'one team' versus 'two teams' is through symbols, e.g. the same uniform scrubs, sharing notice boards and instead of marked discipline-specific desks calling it the 'shared workspaces.'

External restructuring

To address some of the findings requires external changes i.e. changes to other systems within the health system. For example, the acceptance of the rest of the system that the EC would act as a safety net for overflow, office hours, shortages of neuropsychiatric beds etc. All of these add undue strain on the EC, prohibiting the EC from fulfilling its core function.

Other recommendations include repositioning the EM physicians in the hospital (most ECs have another speciality overseeing the EC consultants), the recognition of emergency nursing by the regulatory body and implementing safe nurse staffing levels.

9.4.2 Interprofessional learning

Feedback loops

Feedback loops could be strengthened by doing cognitive debriefs that consider the multiple thought processes involved in operational matters. It could help to shift from a shared 'procedural' mental frame that follows the rules without question, to one that nurtures tacit knowledge and skilled intuition. Improving tacit knowledge could reduce the taxing cognitive load that people are currently experiencing that comes from treating each situation as if it is novel.

Improving feedback loops and shifting the focus to one operational team would enable a fuller picture with integrated inputs from different individuals viewing the same situation from various angles. This focus on operational team processes reduce the reliance on individual expertise, and the deliberate practise of incorporating more views could change the prevailing us-versus-them metaphors and thinking.

Addressing operational situations in silos and using traditional methods to address complex operational issues may cripple the adaptive capability. The EC requires suitable whole-system approaches. Collective event investigation could help to identify and address underlying systemic issues, improving feedback loops and overall operations.

Onboarding

Improving induction programs and creating mentorship opportunities could help reduce the risk of burnout and improve organisational learning. Interdisciplinary inductions could help to improve social cohesion and networks, subsequently improving the sense-making and adaptive capabilities.

Management training

Managerial training and coaching to enhance managerial competence, build experience and tacit knowledge would also be helpful. The type of training envisioned would allow for support and mentoring for managers. Potential topics for managerial training include managing team dynamics, enabling reciprocity and interprofessional communication.

Furthermore, the EC leadership needs to look beyond their traditional ways and set an example of regular interaction by running coherent operations with one set of operational guidelines. They have a responsibility to enable reciprocity, and it should be part of their performance appraisal. This would stress the importance of reciprocity and help to overcome barriers that may persist in the EC manager's minds regarding interprofessional collaboration.

9.5 Future research

The study was designed to be broad, non-hypothesis and exploratory, and further studies could build on what has been contributed. Five of these are:

- A repeat of Klein's macro-cognitive task analysis in the EC. This would identify and improve some of the macro-cognitive functions used in the EC, and improve performance, situational awareness and problem detection (48);
- The physical layout was a recurring topic; therefore, further studies are needed in relation to design and workload, as well as capacity and how these factors enable or constrain cognitive load and collaboration;
- A link was found between length of employment and deeming the emotional tone of a story to be positive. Some participants had less than six months' tenure and they tended to feel overwhelmed. This suggests that further studies are required on induction, mentorship and retention strategies;
- Resource management was a factor, especially the staffing models of nurses. There is a need for better distribution of nurse categories in the EC and studies on the ideal skills mix and distribution in the South African public EC context is required; and

- A study considering the concept of psychological safety in the EC would be useful and would complement this study.

9.6 Conclusion

Emergency physicians are still vying for a legitimate position alongside other medical specialities; when compared to human development, emergency care in South Africa has barely entered its teenage years. It is maturing in a system where the traditional lines between professions and their historical importance are distinct and antiquated. Yet, to function effectively and adapt to the daily challenges, the EC staff require a paradigm shift to develop ECs into environments that embrace integrated operations and interprofessional teamwork. Enabling this to happen implies changing formal structures and dismantling strongly held beliefs, and this appears an opportune time to challenge whether traditional hospital methods are appropriate for the EC.

By addressing complex, evolving operational situations in rigid bureaucracies, the EC is crippled and complex issues that require suitable whole-system approaches remain systematically hidden and unresolved. These multi-level interactions should be tackled from the outside-inwards, bottom-up and top-down.

As parting comment: reliable and efficient EC operations are possible only through developing organisational structures that recognise the interprofessional interdependence and interconnection.

References

1. Rose J, Scheepers R. Structuration theory and information system development-frameworks for practice. ECIS 2001 Proceedings. 2001:80.
2. Snowden D. Positioning complexity and anthro-complexity. Cognitive Edge 2015-2018: Cognitive Edge 2018.
3. Weick KE. Enacted sensemaking in crisis situations Journal of Management Studies. 1988;25(4):305-17.
4. Maitlis S, Christianson M. Sensemaking in Organizations: Taking Stock and Moving Forward. Academy of Management Annals. 2014;8(1):57-125.
5. Schein EH. Organizational culture and leadership: John Wiley & Sons; 2006.
6. Kurtz CF, Snowden DJ. The new dynamics of strategy: Sense-making in a complex and complicated world. IBM systems journal. 2003;42(3):462-83.
7. Weick KE, Sutcliffe KM, Obstfeld D. Organizing and the Process of Sensemaking. Organization Science. 2005;16(4):409-21.
8. Gaventa J, Cornwall A. Challenging the boundaries of the possible: Participation, knowledge and power. IDS Bulletin. 2006;37(6):122-8.
9. Snowden D. Multi-ontology sense making: a new simplicity in decision making. Journal of Innovation in Health Informatics. 2005;13(1):45-53.
10. Kolko J, editor Sensemaking and Framing: A Theoretical Reflection on Perspective in Design Synthesis. Design Research Society Conference; 2010; Montreal, Quebec.
11. Klein G, Moon B, Hoffman RR. Making sense of sensemaking 1: Alternative perspectives. IEEE intelligent systems. 2006;21(4):70-3.
12. Erasmus B, Strydom JW, Rudansky-Kloppers S. Introduction to Business Management: Oxford University Press: Southern Africa; 2016.
13. Edmondson AC, Lei Z. Psychological Safety: The History, Renaissance, and Future of an Interpersonal Construct. Annual Review of Organizational Psychology and Organizational Behavior. 2014;1(1):23-43.
14. Gittell JH, Douglass A. Relational bureaucracy: Structuring reciprocal relationships into roles. Academy of Management Review. 2012;37(4):709-33.
15. Weick KE. The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster. Administrative Science Quarterly. 1993;38(4):628-52.
16. Weick KE, Roberts KH. Collective Mind in Organizations: Heedful Interrelating on Flight Decks. Administrative Science Quarterly. 1993;38(3):357-81.
17. Kurtz CF, Snowden DJ. http://cognitive-edgecom/articles/bramble-bushes-in-a-thicket/ [Internet]2006. [cited 18 July 2018].
18. Klein G. A naturalistic decision making perspective on studying intuitive decision making. Journal of Applied Research in Memory and Cognition. 2015;4(3):164-8.
19. Ponterotto JG. Brief Note on the Origins, Evolution, and Meaning of the Qualitative Research Concept "Thick Description". The Qualitative Report. 2006;11(3):538-49.
20. Dervin B. On studying information seeking methodologically: the implications of connecting metatheory to method. Information Processing & Management. 1999;35(6):727-50.
21. Meadows D. Leverage points. Places to Intervene in a System. 1999:19.
22. Snowden D, Stanbridge P. The landscape of management: Creating the context for understanding social complexity. Emergence: Complexity and Organization. 2004;6(1/2):140.
23. Mager F, Smith B, Guijt I. How Decent is Decent Work? Using SenseMaker to understand workers' experiences. 2018. Report No.: 1787482529.
24. Schein EH. Whistle Blowing: A Message to Leaders and Managers: Comment on" Cultures of Silence and Cultures of Voice: The Role of Whistleblowing in Healthcare Organizations". International Journal of Health Policy and Management. 2016;5(4):265.

25. Dervin B. Given a context by any other name: Methodological tools for taming the unruly beast. Dervin B F-WL, editor. Cresskill, NJ: Hampton Press; 1997. 21 p.
26. Weick KE. Positive Organizing and Organizational Tragedy. Cameron K, Dutton JE, and Quinn RE, editor2003. 66-80 p.
27. CognitiveEdge. https://cognitive-edge.com/about-us/ 2019 [18 March 2019].
28. Brass DJ, Galaskiewicz J, Greve HR, Tsai W. Taking Stock of Networks and Organizations: A Multilevel Perspective. Academy of Management Journal. 2004;47(6):795-817.
29. Snowden D. Working with SenseMaker Data. Lecture notes. Unpublished; 2015 2015.
30. Lega F, DePietro C. Converging patterns in hospital organization: beyond the professional bureaucracy. Health Policy. 2005;74(3):261-81.
31. Maitlis S, Sonenshein S. Sensemaking in Crisis and Change: Inspiration and Insights from Weick (1988). Journal of Management Studies. 2010;47(3):551-80.
32. Klein G, Ross KG, Moon BM, Klein DE, Hoffman RR, Hollnagel E. Macrocognition. IEEE intelligent systems. 2003;18(3):81-5.
33. Klein G, Pierce L. Adaptive teams. Klein Associates Inc Fairburn OH; 2001.
34. Rhodes C, Brown AD. Narrative, organizations and research. International Journal of Management Reviews. 2005;7(3):167-88.
35. Morgan P. The idea and practice of systems thinking and their relevance for capacity development. Maastricht: European Centre for Development Policy Management. 2005.
36. Savolainen R. Information Use as Gap-Bridging: The Viewpoint of Sense-Making Methodology. Journal of the Association for Information Science and Technology. 2006;57(8):1116-25.
37. Foreman-Wernet L, Dervin B. Listening to learn:“Inactive” publics of the arts as exemplar. Public Relations Review. 2006;32(3):287-94.
38. Agarwal NK, editor Making sense of sense-making: tracing the history and development of Dervin’s Sense-Making Methodology. International perspectives on the history of information science and technology: Proceedings of the ASIS&T 2012 Pre-Conference on the History of ASIS&T and Information Science and Technology; 2012: Information Today, Inc.
39. Pontis S, Blandford A. Understanding “Influence”: An Empirical Test of the Data-Frame Theory of Sensemaking. Journal of the Association for Information Science and Technology. 2016;67(4):841-58.
40. Langenberg S, Wesseling H. Making Sense of Weick’s Organising. A Philosophical Exploration. Philosophy of Management. 2016;15(3):221-40.
41. Snowden D. Appendix two: Narrative Research [Internet]. Cognitive Edge2010. [cited 2018].
42. Dervin B. Sense-making theory and practice: an overview of user interests in knowledge seeking and use. Journal of Knowledge Management. 1998;2(2):36-46.
43. Klein G. Naturalistic decision making. Human factors. 2008;50(3):456-60.
44. Shields VR, Dervin B. Sense-making in Feminist Social Science Research: A Call to Enlarge the Methodological Options of Feminist Studies. Women's Studies International Forum. 1993;16(1):65-81.
45. Klein G. The strengths and limitations of teams for detecting problems. Cognition, Technology & Work. 2006;8(4):227-36.
46. Colville I, Brown AD, Pye A. Simplexity: Sensemaking, organizing and storytelling for our time. Human Relations. 2012;65(1):5-15.
47. Schaefer DJ, Dervin B. From the dialogic to the contemplative: a conceptual and empirical rethinking of online communication outcomes as verbing micro-practices. Ethics and Information Technology. 2009;11(4):265.

48. Klein G, Pliske R, Crandall B, Woods DD. Problem detection. Cognition, Technology & Work. 2005;7(1):14-28.
49. Arnsten AF. Stress signalling pathways that impair prefrontal cortex structure and function. Nature reviews neuroscience. 2009;10(6):410.
50. Klein G. Reflections on applications of naturalistic decision making. Journal of Occupational and Organizational Psychology. 2015;88(2):382-6.
51. Klein G, Wright C. Macrocognition: From Theory to Toolbox. Frontiers in Psychology. 2016;7(54):1-5.
52. Dervin B, Schaefer D. Peopling the public sphere. Peace Review. 1999;11(1):17-23.
53. Kahneman D, Klein G. Conditions for Intuitive Expertise: A Failure to Disagree. American Psychologist. 2009;64(6):515.
54. Christianson MK. More and Less Effective Updating: The Role of Trajectory Management in Making Sense Again. Administrative Science Quarterly. 2019;64(1):45-86.
55. Smith MY, Stacey R. Governance and Cooperative Networks: An Adaptive Systems Perspective. Technological Forecasting and Social Change. 1997;54(1):79-94.
56. Cheung DS, Kelly JJ, Beach C, Berkeley RP, Bitterman RA, Broida RI, et al. Improving Handoffs in the Emergency Department. Annals of Emergency Medicine. 2010;55(2):171-80.
57. Hoot NR, Aronsky D. Systematic Review of Emergency Department Crowding: Causes, Effects, and Solutions. Annals of Emergency Medicine. 2008;52(2):126-36. e1.
58. Moskop JC, Sklar DP, Geiderman JM, Schears RM, Bookman KJ. Emergency Department Crowding, Part 2—Barriers to Reform and Strategies to Overcome Them. Annals of Emergency Medicine. 2009;53(5):612-7.
59. Weick KE, Sutcliffe KM. Managing the Unexpected. Sustained Performance in a Complex World. Third Edition ed. Hoboken, New Jersey: John Wiley & Sons, Inc. ; 2015. 197 p.
60. Belfrage C, Hauf F. The Gentle Art of Retroduction: Critical Realism, Cultural Political Economy and Critical Grounded Theory. Organization Studies. 2017;38(2):251-71.
61. Henriksen K, Dayton E. Organizational Silence and Hidden Threats to Patient Safety. Public Policy and Research Agenda. 2006;41(4p2):1539-54.
62. Guijt I, Seeboldt S. The Power of Understanding Power. Capacity org. 2009;Sept(37).
63. Klein G, Moon B, Hoffman RR. Making Sense of Sensemaking 2: A Macrocognitive Model. IEEE Intelligent systems. 2006;21(5):88-92.
64. Schein EH. Organization development: A Jossey-Bass reader: John Wiley & Sons; 2017.
65. Kozlowski SWJ, Ilgen DR. Enhancing the Effectiveness of Work Groups and Teams. Psychological Science in the Public Interest. 2006;7(3):77-124.
66. Sollami A, Caricati L, Mancini T. Ambivalent stereotypes of nurses and physicians: impact on students' attitude toward interprofessional education. Acta Bio Medica Atenei Parmensis. 2015;86(1Suppl):19-28.
67. Fagin L, Garelick A. The doctor–nurse relationship. Advances in psychiatric treatment. 2004;10(4):277-86.
68. Vazirani S, Hays RD, Shapiro MF, Cowan M. Effect of a Multidisciplinary Intervention on Communication and Collaboration Among Physicians and Nurses. American Journal of Critical Care. 2005;14(1):71-7.
69. Manias E, Street A. Nurse–doctor interactions during critical care ward rounds. Journal of clinical nursing. 2001;10(4):442-50.
70. Atwal A, Caldwell K. Do all health and social care professionals interact equally: a study of interactions in multidisciplinary teams in the United Kingdom. Scandinavian Journal of Caring Sciences. 2005;19(3):268-73.
71. Carmeli A, Brueller D, Dutton JE. Learning Behaviours in the Workplace: The Role of High-quality Interpersonal Relationships and Psychological Safety. Systems Research and

Behavioral Science: The Official Journal of the International Federation for Systems Research. 2009;26(1):81-98.
72. Tucker AL. An Empirical Study of System Improvement by Frontline Employees in Hospital Units. Manufacturing & Service Operations Management. 2007;9(4):492-505.
73. Cain CL, Frazer M, Kilaberia TR. Identity work within attempts to transform healthcare: Invisible team processes. Human Relations. 2018:1-27.
74. Johnson A, Nguyen H, Groth M, White L. Reaping the Rewards of Functional Diversity in Healthcare Teams: Why Team Processes Improve Performance. Group & Organization Management. 2018;43(3):440-74.
75. Rook L, Watson G. Chaotic edge thinking: Understanding why work practices fail. Emergence: Complexity and Organization. 2017;1(Nov):18.
76. Sparrowe RT, Liden RC, Wayne SJ, Kraimer ML. Social Networks and the Performance of Individuals and Groups. Academy of Management Journal. 2001;44(2):316-25.
77. Labianca G, Brass DJ. Exploring the Social Ledger: Negative Relationships and Negative Asymmetry in Social Networks in Organizations. Academy of Management Review. 2006;31(3):596-614.
78. Hardcastle MAR, Usher KJ, Holmes CA. An overview of structuration theory and its usefulness for nursing research. Nursing Philosophy. 2005;6(4):223-34.
79. Berends H, Boersma K, Weggeman M. The structuration of organizational learning. Human relations. 2003;56(9):1035-56.
80. Rouse MJ, Zietsma C, editors. Emergent Adaptive Capabilities. Responding to weak signals: The emergence of adaptive dynamic capabilities for strategic renewal. The International Conference on Organizational Learning, Knowledge and Capabilities; 2008; Copenhagen, Denmark.
81. Wachs P, Saurin TA, Righi AW, Wears RL. Resilience skills as emergent phenomena: A study of emergency departments in Brazil and the United States. Applied Ergonomics. 2016;56:227-37.
82. Brown AD. A Narrative Approach to Collective Identities. Journal of Management Studies. 2006;43(4):731-53.
83. Schwandt TA. Constructivist, Interpretivist Approaches to Human Inquiry. Handbook of Qualitative Research. 1994;1:118-37.
84. Robbins S. Organizational behaviour: concepts, controversies, applications. 8th ed. New Jersey: Prentice Hall; 1998. 674 p.
85. Robson C. Real world research : a resource for users of social research methods in applied settings. 3rd ed. ed. Chichester, West Sussex: Wiley; 2011.
86. Argyris C. Single-Loop and Double-Loop Models in Research on Decision Making. Administrative Science Quarterly. 1976;21(3):363-75.
87. Dervin B, Clark KD, Coco A, Foreman-Wernet L, Rajendram CP, Reinhard CD. Sense-Making as Methodology for Spirituality Theory, Praxis, Pedagogy, and Research. Critical Issues. 2012:83.
88. Klein DE, Woods DD, Klein G, Perry SJ. Can We Trust Best Practices? Six Cognitive Challenges of Evidence-Based Approaches. Journal of Cognitive Engineering and Decision Making. 2016;10(3):244-54.
89. Klein G. Whose fallacies? Journal of Cognitive Engineering and Decision Making. 2015;9(1):55-8.
90. Klein G HR. Seeing the Invisible: The Perceptual Cognitive Aspects of Expertise. Cognitive Science Foundations of Instruction. 1993:203-26.
91. Kahneman D. A Perspective on Judgment and Choice: Mapping Bounded Rationality. American Psychologist. 2003;58(9):697.
92. Gigerenzer G, Gaissmaier W. Heuristic Decision Making. Annual Review of Psychology. 2011;62:451-82.

93. Tucker AL, Edmondson AC. Why Hospitals Don't Learn from Failures: Organizational and Psychological Dynamics That Inhibit System Change. California Management Review. 2003;45(2):55-72.
94. Von Holdt K, Murphy M. Public Hospitals in South Africa: Stressed Institutions, Disempowered Management. Buhlungu S DJ, Southall R, Lutchman J, editor. Cape Town: HSRC Press; 2007. 312-41 p.
95. Weller J, Boyd M, Cumin D. Teams, tribes and patient safety: overcoming barriers to effective teamwork in healthcare. Postgraduate Medical Journal. 2014;90(1061):149.
96. Waterman Jr RH, Peters TJ, Phillips JR. Structure is not organization. Business Horizons. 1980;23(3):14-26.
97. Gershon RR, Stone PW, Bakken S, Larson E. Measurement of Organizational Culture and Climate in Healthcare. JONA: The Journal of Nursing Administration. 2004;34(1):33-40.
98. Ostroff C, Kinicki AJ, Muhammad RS. Organizational culture and climate. Handbook of Psychology, Second Edition. 2012;12.
99. Glisson C, James LR. The cross-level effects of culture and climate in human service teams. Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior. 2002;23(6):767-94.
100. Schein EH. Sense and Nonsense about Culture and Climate. 1999.
101. Vogus TJ, Sutcliffe KM, Weick KE. Doing No Harm: Enabling, Enacting, and Elaborating a Culture of Safety in Health Care. The Academy of Management Perspectives. 2010;24(4):60-77.
102. Hall P. Interprofessional teamwork: Professional cultures as barriers. Journal of Interprofessional Care. 2005;19(S1):188-96.
103. Snowden DJ, Boone ME. A Leader's Framework for Decision Making. Harvard Business Review. 2007;85(11):68.
104. Vosloo M. SenseMaker as research tool. The origins of SenseMaker. Personal Communication ed. Unpublished2016/01/30. p. 8.
105. Kurtz CF. The Wisdom of Clouds. White Paper. 2009b.
106. Jenal M CS. Gaining systemic insight to strenghten economic development initiatives. Scharans and Pretoria: Mesopartner; 2013. Contract No.: Mesopartner Working Paper 16, version 2.
107. Pype P, Krystallidou D, Deveugele M, Mertens F, Rubinelli S, Devisch I. Healthcare teams as complex adaptive systems: Focus on interpersonal interaction. Patient Education and Counseling. 2017;100(11):2028-34.
108. Kreindler SA. The stipulation-stimulation spiral: A model of system change. The International Journal of Health Planning and Management. 2019.
109. Snowden D. Seven Characteristics of Complex Adaptive Systems. Online foundations course. Cognitive Edge 2015-2018; 2018.
110. Cunliffe AL, Luhman JT. Key Concepts in Organization Theory. London: Sage Publications; 2012 2013. 180 p.
111. Plsek PE, Greenhalgh T. Complexity science: The challenge of complexity in health care. BMJ: British Medical Journal. 2001;323(7313):625.
112. Jayasinghe S. Conceptualising population health: from mechanistic thinking to complexity science. Emerging Themes in Epidemiology. 2011;8(1):2.
113. Eoyang GH. Human Systems Dynamics: Complexity-based approach to a complex evaluation. Systems concepts in evaluation: An expert anthology. 2006:123-39.
114. Akgün AE, Keskin H, Byrne J. Antecedents and Contingent Effects of Organizational Adaptive Capability on Firm Product Innovativeness. Journal of Product Innovation Management. 2012;29:171-89.

115. Boisot M, McKelvey B. Integrating Modernist and Postmodernist Perspectives on Organizations: A Complexity Science Bridge. Academy of Management Review. 2010;35(3):415-33.
116. Cannon-Bowers JA, Tannenbaum SI, Salas E, Volpe CE. Defining Competencies and Establishing Team Training Requirements. Team Effectiveness and Decision Making in Organizations. 1995;333:380.
117. Heal S. Adaptive decision-making. Tactical Edge. 2013:82-4.
118. Kozlowski SW, Gully SM, Brown KG, Salas E, Smith EM, Nason ER. Effects of training goals and goal orientation traits on multidimensional training outcomes and performance adaptability. Organizational Behavior and Human Decision Processes. 2001;85(1):1-31.
119. Neill S, McKee D, Rose G. Developing the organization's sensemaking capability: Precursor to an adaptive strategic marketing response. Industrial Marketing Management. 2007;36(6):731-44.
120. Staber U, Sydow J. Organizational Adaptive Capacity: A Structuration Perspective. Journal of Management Inquiry. 2002;11(4):408-24.
121. Weick KE. Faith, Evidence, and Action: Better Guesses in an Unknowable world. Organization Studies. 2006;27(11):1723-36.
122. Burke CS, Stagl KC, Salas E, Pierce L, Kendall D. Understanding Team Adaptation: A Conceptual Analysis and Model. Journal of Applied Psychology. 2006;91(6):1189.
123. Laxmisan A, Hakimzada F, Sayan OR, Green RA, Zhang J, Patel VL. The multitasking clinician: Decision-making and cognitive demand during and after team handoffs in emergency care. International Journal of Medical Informatics. 2007;76(11-12):801-11.
124. Richardson DB, Mountain D. Myths versus facts in emergency department overcrowding and hospital access block. Medical Journal of Australia. 2009;190(7):369.
125. Marais DL, Petersen I. Health system governance to support integrated mental health care in South Africa: challenges and opportunities. International Journal of Mental Health Systems. 2015;9(1):14.
126. Government WC. Western Cape Government Health: Annual Report 2015/2016. In: Health Do, editor. Cape Town: Western Cape Government Health; 2015/16. p. 294.
127. Government WC. Western Cape Government Health Annual Report. In: Health, editor. Cape Town: Western Cape Government printers; 2016/17. p. 294.
128. Medicine Io. Hospital-based emergency care: at the breaking point. In: Committee on the Future of Emergency Care in the United States Health S, editor.: Washington, DC: National Academies Press; 2006.
129. Eitel DR, Rudkin SE, Malvehy MA, Killeen JP, Pines JM. Improving service quality by understanding emergency department flow: a White Paper and position statement prepared for the American Academy of Emergency Medicine. The Journal of Emergency Medicine. 2010;38(1):70-9.
130. Jones R. Hospital bed occupancy demystified. British Journal of Healthcare Management. 2011;17(6):242-8.
131. Forero R, McCarthy S, Hillman K. Access block and emergency department overcrowding. Critical Care. 2011;15(2):216.
132. Bain CA, Taylor PG, McDonnell G, Georgiou A. Myths of ideal hospital occupancy. Medical Journal of Australia. 2010;192(1):42.
133. Keegan AD. Hospital bed occupancy: More than queuing for a bed. Medical Journal of Australia. 2010;193(5):291-3.
134. Najjar L. Bed utilisation trends in selected wards across eight district hospital wards in the Cape Town District. Cape Town: University of the Western Cape; 2018.
135. Franklin A, Liu Y, Li Z, Nguyen V, Johnson TR, Robinson D, et al. Opportunistic decision making and complexity in emergency care. Journal of Biomedical Informatics. 2011;44(3):469-76.

136. Moskop JC, Sklar DP, Geiderman JM, Schears RM, Bookman KJ. Emergency Department Crowding, Part 1—Concept, Causes, and Moral Consequences. Annals of Emergency Medicine. 2009;53(5):605-11.
137. Leiter MP, Maslach C. Six areas of worklife: a model of the organizational context of burnout. Journal of Health and Human Services Administration. 1999;21(4):472-89.
138. Twomey M, Wallis LA, Thompson ML, Myers JE. The South African triage scale (adult version) provides valid acuity ratings when used by doctors and enrolled nursing assistants. African Journal of Emergency Medicine. 2012;2(1):3-12.
139. DOH. Western Cape Department of Health: Policy for implementation of Triage in patients in the Western Cape Emergency Centre's Cape Town, Western Cape 2012.
140. Chiu IM, Lin YR, Syue YJ, Kung CT, Wu KH, Li CJ. The influence of crowding on clinical practice in the emergency department. The American journal of emergency medicine. 2018;36:56- 60.
141. Hunter L, Lahri S, van Hoving D. Case mix of patients managed in the resuscitation area of a district-level public hospital in Cape Town. African Journal of Emergency Medicine. 2017;7(1):19-23.
142. Armstrong SJ, Rispel LC, Penn-Kekana L. The activities of hospital nursing unit managers and quality of patient care in South African hospitals: a paradox? Global Health Action. 2015;8(1):26243.
143. Gittell JH, Godfrey M, Thistlethwaite J. Interprofessional collaborative practice and relational coordination: improving healthcare through relationships. Journal of Interprofessional Care. 2013;27:210 -3.
144. Klein G, Snowden D, Pin CL, editors. Anticipatory Thinking. Informed by Knowledge: Expert Performance in Complex Situations. 8th International Naturalistic Decision Making Conference; 2007; Pacific Grove.
145. Van Der Vegt GS, Bunderson JS. Learning and Performance in Multidisciplinary Teams: The Importance of Collective Team Identification. Academy of Management Journal. 2005;48(3):532-47.
146. Lyubovnikova J, West MA, Dawson JF, Carter MR. 24-Karat or fool's gold? Consequences of real team and co-acting group membership in healthcare organizations. European Journal of Work and Organizational Psychology. 2014;24(6):1-22.
147. Ogbonnaya C, Tillman CJ, Gonzalez K. Perceived Organizational Support in Health Care: The Importance of Teamwork and Training for Employee Well-Being and Patient Satisfaction. Group & Organization Management. 2018;43(3):475-503.
148. Blondon KS, Chan KG, Muller-Juge V, Cullati S, Hudelson P, Maître F, et al. A concordance-based study to assess doctors' and nurses' mental models in Internal Medicine. PloS one. 2017;12(8):e0182608.
149. Edmondson A. Psychological Safety and Learning Behavior in Work Teams. Administrative Science Quarterly. 1999;44(2):350-83.
150. Buljac-Samardzic M, Dekker-van Doorn C, Maynard MT. Teamwork and Teamwork Training in Health care: An Integration and a Path Forward. Group & Organization Management. 2018;43(3):351-6.
151. SANC. South African Nursing Council webpage: http://www.sanc.co.za/about.htm; 2004-2018 [cited 2018 13 November].
152. HPCSA. Health Professionals Council of South Africa webpage: http://www.hpcsa.co.za/Professionals; 2018 [cited 2018 3 March].
153. Nursing Act, no 33 of 2005, (2005).
154. Nursing CSA. Impairment Committee Report: Management of controlled scheduled medicines/substances in healthcare establishments to minimize errors and abuse caused by improper control. Professional Nursing Today. 2018;22(2):3.

155. Hardcastle TC, Brysiewicz P. Trauma care in South Africa: from humble beginnings to an afrocentric outreach. International Emergency Nursing. 2013;21(2):118-22.
156. Wolf LA, Perhats C, Delao AM, Clark PR, Moon MD. On the Threshold of Safety: A Qualitative Exploration of Nurses' Perceptions of Factors Involved in Safe Staffing Levels in Emergency Departments. Journal of Emergency Nursing. 2017;43(2):150-7.
157. Rispel LC. Transforming nursing policy, practice and management in South Africa. Global Health Action. 2015;8(1):28005.
158. Rubinstein S, Martin-Rios C, Hoffer Gittell J, Erhardt N, George V. Cross-Boundary Coordination Under Organizational Stress: Communication Patterns and Resilience. Industry Studies Association: Working paper series. 2008;WP-2008-04.
159. Wallis LA, Garach SR, Kropman A. State of emergency medicine in South Africa. International Journal of Emergency Medicine. 2008;1(2):69-71.
160. Brysiewicz P, Bruce J. Emergency nursing in South Africa. International Emergency Nursing. 2008;16(2):127-31.
161. Coovadia H, Jewkes R, Barron P, Sanders D, McIntyre D. The health and health system of South Africa: historical roots of current public health challenges. The Lancet. 2009;374(9692):817-34.
162. Econex. The South African Private Healthcare Sector: Role and contribution to the Economy. South Africa: South African Private Practitioner Forum (SAPFF) and HealthMan (pty) Ltd; November 2013 November 2013. Contract No.: 1.
163. Mcintyre D, Thiede M, Nkosi M, Mutyambizi V, Castillo-riquelme M, Gilson L, et al. SHIELD work package 1 report: a critical analysis of the current South African Health System. 2007.
164. Wadee H, Gilson L, Thiede M, Okorafor O, McIntyre D. Health care inequity in South Africa and the public-private mix. Geneva: Switzerland; 2003.
165. Chopra M, Lawn JE, Sanders D, Barron P, Karim SSA, Bradshaw D, et al. Achieving the health Millennium Development Goals for South Africa: challenges and priorities. The Lancet. 2009;374(9694):1023-31.
166. Benatar SR. Health care reform in the new South Africa. New England Journal of Medicine. 1997;336(12):891-6.
167. Chopra M, Daviaud E, Pattinson R, Fonn S, Lawn JE. Saving the lives of South Africa's mothers, babies, and children: can the health system deliver? The Lancet. 2009;374(9692):835-46.
168. Mayosi BM, Lawn JE, Van Niekerk A, Bradshaw D, Karim SSA, Coovadia HM, et al. Health in South Africa: changes and challenges since 2009. The Lancet. 2012;380(9858):2029-43.
169. Mediclinic. Annual Report and financial statements for year ending 31 March 2016. Annual Report and financial statements. Cape Town, South Africa: Mediclinic International; 2016.
170. NDOH. National Core Standards for Health Establishments in South Africa. In: Health NDo, editor. Tswane: South Africa: National Department of Health Pretoria; 2011. p. 1 -52.
171. Pillay Y, Barron P. On the path to reach the SDG targets: Decreasing maternal and child mortality in South Africa. South African Medical Journal. 2018;108(Supplement 1):S2-S3.
172. Seedat M, Van Niekerk A, Jewkes R, Suffla S, Ratele K. Violence and injuries in South Africa: prioritising an agenda for prevention. The Lancet. 2009;374(9694):1011-22.
173. Möller A, Hunter L, Kurland L, Lahri S, van Hoving DJ. The association between hospital arrival time, transport method, prehospital time intervals, and in-hospital mortality in trauma patients presenting to Khayelitsha Hospital, Cape Town. African Journal of Emergency Medicine. 2018;8(3):5.

174. Hodkinson P, Wallis L. Cross-sectional survey of patients presenting to a South African urban emergency centre. Emergency Medicine Journal. 2009;26(9):635-40.
175. Nicol A, Knowlton LM, Schuurman N, Matzopoulos R, Zargaran E, Cinnamon J, et al. Trauma Surveillance in Cape Town, South Africa: An Analysis of 9236 Consecutive Trauma Center Admissions. JAMA Surgery. 2014;149(6):549-56.
176. Wallis LA, Twomey M. Workload and casemix in Cape Town emergency departments. South African Medical Journal. 2007;97(12):1276-80.
177. Hardcastle TC, Oosthuizen G, Clarke D, Lutge E. Trauma, a preventable burden of disease in South Africa: review of the evidence, with a focus on KwaZulu-Natal. South African Health Review. 2016;2016(1):179-89.
178. Laupland KB, Ball CG, Kirkpatrick AW. Hospital mortality among major trauma victims admitted on weekends and evenings: a cohort study. Journal of Trauma Management & Outcomes. 2009;3(1):8.
179. Mayosi BM, Benatar SR. Health and health care in South Africa—20 years after Mandela. New England Journal of Medicine. 2014;371(14):1344-53.
180. Pillay-van Wyk V, Msemburi W, Laubscher R, Dorrington RE, Groenewald P, Glass T, et al. Mortality trends and differentials in South Africa from 1997 to 2012: second National Burden of Disease Study. The Lancet Global Health. 2016;4(9):e642-e53.
181. Rispel LC, de Jager P, Fonn S. Exploring corruption in the South African health sector. Health Policy and Planning. 2015;31(2):239-49.
182. Von Holdt K. Nationalism, Bureaucracy and the Developmental State: The South African Case. South African Review of Sociology. 2010;41(1):4-27.
183. Fusheini A, Eyles J, Goudge J. The Social Determinants of Health and the Role of the Health Care System: A Case Study of the Significance of Good Governance in Public Hospitals in South Africa. Health. 2016;8(8):1288-306.
184. Brysiewicz P. Trauma in South Africa. International Journal of Trauma Nursing. 2001;7(4):129-32.
185. Guba EG. Competing Paradigms in Qualitative Research. Lincoln YS, Denzin NK, editor. Thousand Oaks, California: Sage; 1994. 105-18 p.
186. Schwandt TA. The Landscape of Qualitative Research: Theories and Issues. Thousand Oakes: Sage Publications; 1998.
187. Carter SM, Little M. Justifying Knowledge, Justifying Method, Taking Action: Epistemologies, Methodologies, and Methods in Qualitative Research. Qualitative Health Research. 2007;17(10):1316-28.
188. Angen MJ. Pearls, Piths, and Provocation. Evaluating Interpretive Inquiry: Reviewing the Validity Debate and Opening the Dialogue. Qualitative Health Research. 2000;10(3):378-95.
189. Timmermans S, Tavory I. Theory Construction in Qualitative Research: From Grounded Theory to Abductive Analysis. Sociological Theory. 2012;30(3):167-86.
190. Pietarinen A-VJ. The Science to Save Us from Philosophy of Science. Axiomathes. 2015;25(2):149-66.
191. Patnaik E. Reflexivity: Situating the Researcher in Qualitative Research. Humanities and Social Science Studies. 2013;2(2):98-106.
192. Ayim M. Retroduction: The Rational Instinct. Transactions of the Charles S Peirce Society. 1974;10(1):34-43.
193. Connelly F, Clandinin D. Stories of Experience and Narrative Inquiry. Educational Researcher. 1990;19(5):2-14.
194. Brown AD, Gabriel Y, Gherardi S. Storytelling and Change: An Unfolding Story. Organization. 2009;16(3):323-33.
195. Lakoff G. The Political Mind. A cognitive scientist's guide to your brain and its politics. New York: Viking Penguin; 2009. 282 p.

196. Rogan A, de Kock D. Chronicles From the Classroom: Making Sense of the Methodology and Methods of Narrative Analysis. Qualitative Inquiry. 2005;11(4):628-49.
197. Erlingsson C, Brysiewicz P. A hands-on guide to doing content analysis. African Journal of Emergency Medicine. 2017;7(3):93-9.
198. Creswell J, Miller D. Determining Validity in Qualitative Inquiry. Theory into practice. 2000;39(3):124-30.
199. Finlay L. 'Rigour','ethical integrity'or 'artistry'? Reflexively reviewing criteria for evaluating qualitative research. British Journal of Occupational Therapy. 2006;69(7):319-26.
200. Loh J. Inquiry into Issues of Trustworthiness and Quality in Narrative Studies: A Perspective. The Qualitative Report. 2013;18(33):1-15.
201. Nowell LS, Norris JM, White DE, Moules NJ. Thematic Analysis:Striving to Meet the Trustworthiness Criteria. International Journal of Qualitative Methods. 2017;16(1):1609406917733847.
202. S F. Cynefin: repeatability, science and values. Newsletter of the European Working Group 'Multiple Criteria Decision Aiding. 2008;17 (3):5.
203. Dwyer SC, Buckle JL. The Space Between: On Being an Insider-Outsider in Qualitative Research. International Journal of Qualitative Methods. 2009;8(1):54-63.
204. Miehls D, Moffatt K. Constructing social work identity based on the reflexive self. British Journal of Social Work. 2000;30(3):339-48.
205. DOH. Western Cape Department of Health: Departmental standards for Emergency Centres. Cape Town; 2014. Report No.: Circular H44 of 2014.
206. Gittell JH, Weiss L. Coordination Networks Within And Across Organizations: A Multi-level Framework. Journal of Management Studies. 2004;41(1):127-53.
207. DOH. Western Cape Department of Health: Emergency Case Load Management Policy. Cape Town; 2012. Report No.: Circular H145 of 2012.
208. DOH. Western Cape Department of Health: Emergency Centres in the Western Cape: Regional and District hospitals. Western Cape; 2010.
209. DOH. Western Cape Department of Health: Standardised uniform for nursing personnel. 2013.
210. Churchman JJ, Doherty C. Nurses' views on challenging doctors' practice in an acute hospital. Nursing Standard (through 2013). 2010;24(40):42.
211. (UK) NHS. Safe to fail experiments [Online library]. United Kingdom2018 [updated 10 April 2018; cited 01/01/2020 01/01/2020].
212. Neuman J, Baron R. Workplace Violence and Workplace Aggression: Evidence Concerning Specific Forms, Potential Causes, and Preferred Targets. Journal of Management. 1998;24(3):391-419.

Appendix 1: Checklist to guide descriptive study

Dr Breakdown
Emergency physicians
Medical Officers
Interns
Other
Nursing breakdown
Professional nurse
Enrolled nurse
Enrolled nurse auxiliary
Temp staff
Categories
Temp staff: frequency
Other staff
Bed Manager
Located in unit Y/N
Stock controller
Located in unit Y/N
Medical Manager
Located in unit Y/N
Human Resources
Staff turnover rate esp. in senior roles
Doctor and nurse notes kept together or apart?
Access PACS, pathology results etc.

Other general stuff
Are waiting times measured
Who manages waiting time issues
Improvement projects: integrated/separate

Structure
Organogram
Reporting structure during a shift
Functional organogram
Strategy
Vision and mission statement
Objectives
Strategic planning
Shared values
Shared spaces
Interactions
Shared strategy, structure & systems?
Systems: budget
Size of staff budget
Who manages the staffing budget
Equipment budget?
Consultation on wish list?
Training budget and type of training
Systems: Communication
Notice board? Where & focused for?
WA group (s) including who?
Communication file
Systems: Policy and procedure
Policy files - integrated or separate
SOP's - integrated or separate
Adverse events - management
Schedule drugs - procedure/responsibilities
Stock shortages - how is it managed?

Physical layout
Designated triage area
Triage area used
Qualification of triage nurse
Dedicated resuscitation area
Number of beds in resuscitation
Dedicated allocation to resuscitation area?
Overnight ward: the amount of beds
Dedicated nurse for overnight ward
Who looks after overnight ward- surgeon, EC
Dedicated paediatric area
Number of seats in the waiting area
Who oversees the waiting area?
Dedicated area for psychiatric patients
Dedicated security
Where is the dedicated security situated?
Dedicated porter in unit
Where is admin staff located?
Distance to X-rays facilities available in unit
Pathology: phlebotomist available in the unit?
Tearooms: separate or together?
If separate, is there a difference in utilities
Are there staff toilets?
Are there lockers for all staff
Communication triage and rest of EC?
Hospital
Number of hospital beds
Number of ICU beds in the hospital

Who is accountable for improvement programs
Who manages patient complaints
Patient register - who is responsible for keeping it
Who maintains &cleans equipment etc.
The reporting system for malfunctioning equipment
Process for dealing with out of stock items
Unit specific additional stuff (e.g. post-operative patients)

Style: staff
Shift system for doctors
Shift system for nurses
Nurse allocation: patient or task specific?
Ward rounds - time, who attends
How does allocation occur
Daily drug check
Daily resus trolley check?
Background
Patient mix - monthly stats (adult, child, psych)
Dr to patient ratio
Nurse to patient ratio
Average LOS in the overnight ward
Average LOS in EC

Number of high care beds in the hospital
Theatres facilities
Process Maps
Flow map for patients in EC
Process Map for admission into the ward
Process Map for admission into EC
Transfer process to another hospital
Access and egress into the unit?
Get a blueprint of the hospital - for SQM of EC -
Furniture
Wheel chairs
Bed trolleys
Resus trolleys
Lazy boy chairs/other chairs

Appendix 2: SenseMaker® survey (copied from the electronic link)

Whilst showing a new colleague around in the EC, you are interrupted to assist with a challenging situation. When you touch base with the colleague later, they ask how often these types of challenging situations arise and what they should do.

What experience would you share with them that demonstrates the type of challenges that people in this EC deals with? Refer to the difference between normal and challenging situations and how the team responds.

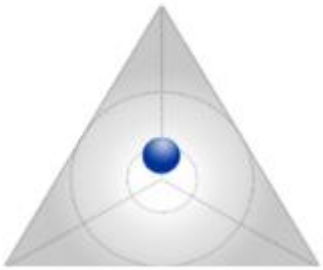
Please enter your story here:

Please provide a title for your story.

The following questions will use a series of triangles with words at each corner. Please place a dot closest to the position that you feel best represents your story. The closer you place the dot to the word (s), the closer the match with your story. Placing the dot in the middle of the triangle, equal distances from the corners, indicates that all three elements are equally represented in the story. Thinking about the story that you just shared, please answer the following questions

In your story, during the crisis in the EC the role of the manager was to ...

Secure the right resources

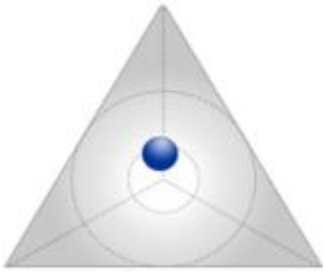


Guide and lead the EC team

Coordinate with the sources outside of the EC

In your story, you were most hampered by

Information

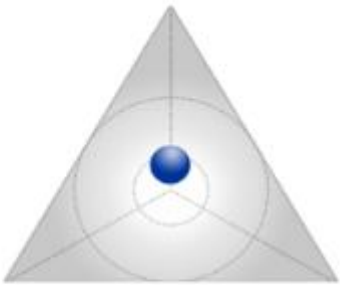


Support

Power to influence

In your story, it was best to do things based on ...

Following the rules and policies



What worked before

What the situation needed

In your story, uncertainty came from

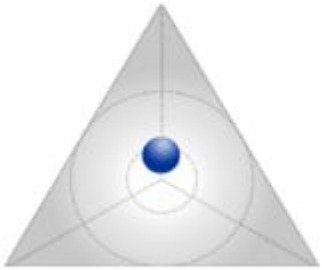
Incomplete Information

Inadequate understanding

Unclear perspectives

In your story, people acted based on

Intuition

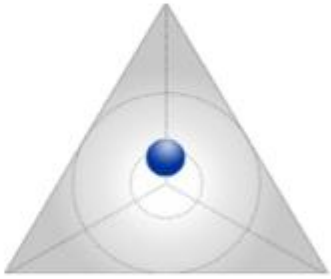


Experience and training

The orders given

In your story, the decision was most influenced by

Consensus amongst team



Guidelines and rules

An authority figure

In situations like your story, when information and explanation do not match, it is best to ...

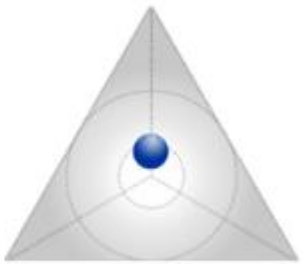
Live with the difference

Check and reinterpret information

Look for additional information

In situations like this, people are more likely to express concern when ..

You disagree with the decision

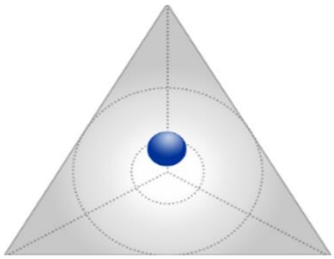


You are unsure about what's going on

You notice something worrying

In your story, the pressure was on doing something that was ...

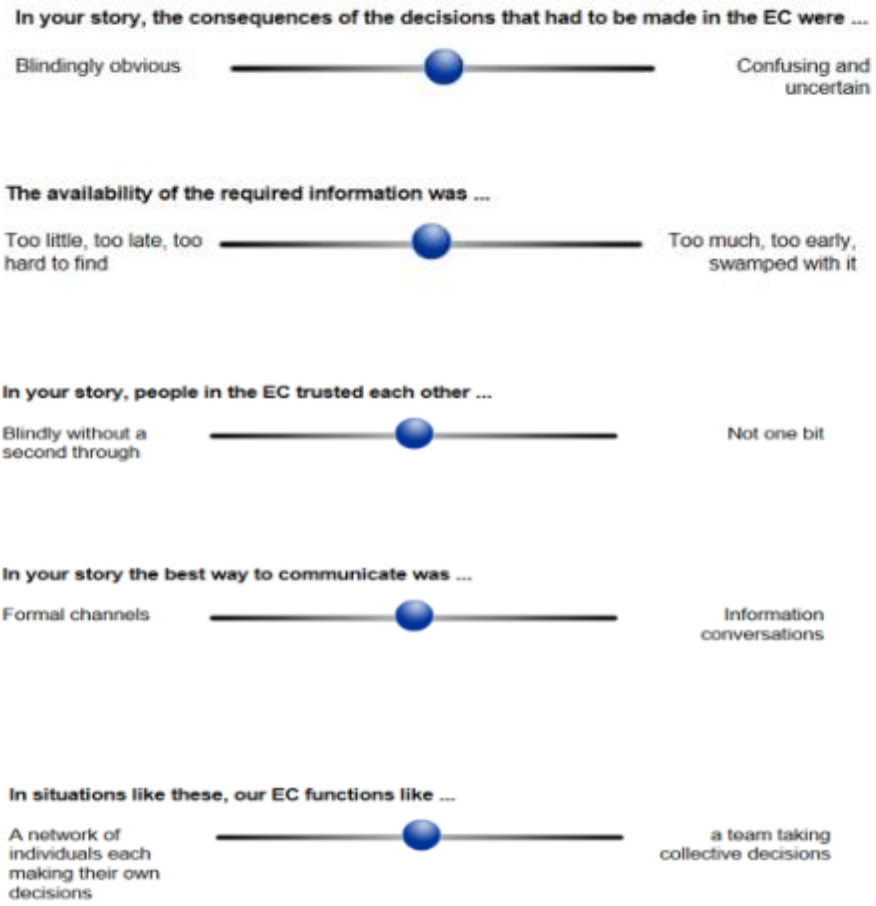
Sensible



Correct

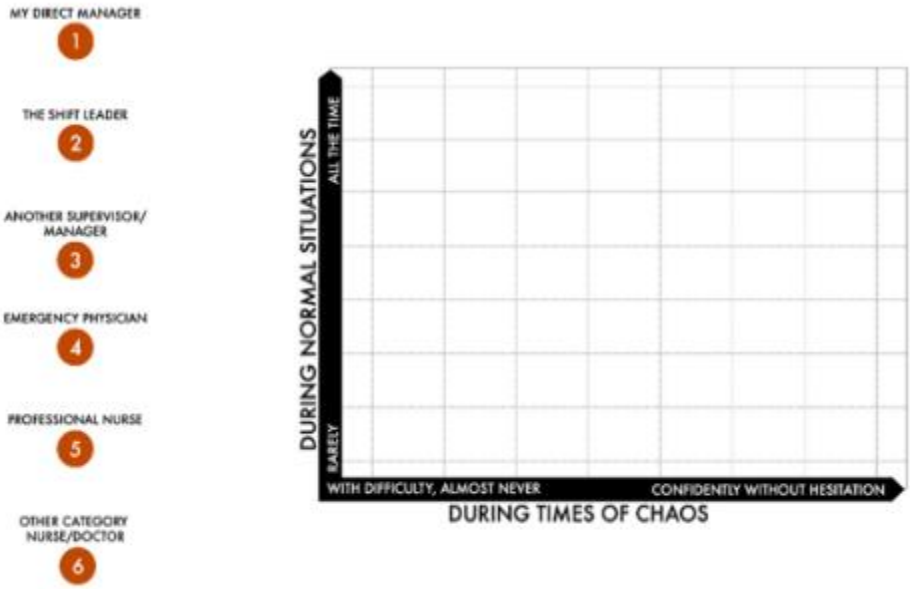
Quick

The following questions will use a series of bars with a word at each end. Please move the dot to the position that you feel best represents your story. The closer you move your dot to the words, the more it matches with your story. Moving the dot to the middle of the bar indicates that both elements are equally represented in the story.



If you had to place each of the following people on the canvas, where on the canvas would you place them to show who at work you would share your concerns with.

There is only one space per person, if a person does not apply, do not place them on the canvas.



Looking back at the incident now, you feel ..

Strongly Positive
Positive
Neutral
Negative
Strongly Negative

Your role in the story was ...

I act as the link between different groups
I controlled the flow of information
I watched from the sideline
I took action and followed orders
I raised the alarm and made people aware
I took decisions that impacted on the outcome

Working in EC is like ...

What is your role in the EC? (Tick more than one if applicable)

- ☐ Enrolled Nursing Assistant
- ☐ Enrolled Nurse
- ☐ Professional Nurse
- ☐ Medical Officer
- ☐ Consultant/Emergency Physician
- ☐ Manager
- ☐ Shift leader

What is the highest level of education that you have achieved? (tick more than one if applicable)

- ☐ MBChB
- ☐ DipPEC
- ☐ MMed (Emergency Medicine)
- ☐ Professional Nurse with postgrad dip in ICU or EC
- ☐ Professional Nurse
- ☐ Enrolled Nurse (Staff Nurse)
- ☐ Enrolled Nurse Auxiliary (Nurse Assistant)
- ☐ Management course that lasted more than 6 months
- ☐ Management course that lasted less than 6 months

How long have you worked in EC (overall)?

- ---------
- Less than 6 months
- More than 6 months but less than a year
- One year to 5 years
- More than 5 years, but less than 10 years
- More than 10 years

How long have you worked in the EC where you are currently working?

- ---------
- Less than 6 months
- More than 6 months but less than a year
- One year to 5 years
- More than 5 years, but less than 10 years
- More than 10 years

Appendix 3: Approval UCT Faculty of Health Sciences, Human Research Ethics Committee

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room E53-46 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone (021) 406 6626
Email: shureta.thomas@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

01 August 2017

HREC REF: 487/2017

Prof Lee Wallis
C/O Eileen Maas
Emergency Medicine
F51, OMB

Dear Prof Wallis

PROJECT TITLE: THE ADAPTIVE CAPABILITY OF THE OPERATIONAL TEAM TO RESPOND TO CHALLENGES IN THE EMERGENCY CENTRE. A SENSEMAKER® STUDY IN ENERGENCY CENTRES WITHIN CAPE TOWN (PHD CANDIDATE - MS C CUNNINGHAM)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

- Please change the title of the HREC from the *UCT Institutional Review Board* to the UCT FHS Human Research Ethics Committee (HREC).

Approval is granted for one year until the 30 August 2018.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval before the research may occur.

The HREC acknowledge that the student, Charmaine Cunningham will also be involved in this study.

Yours sincerely

Signature Removed

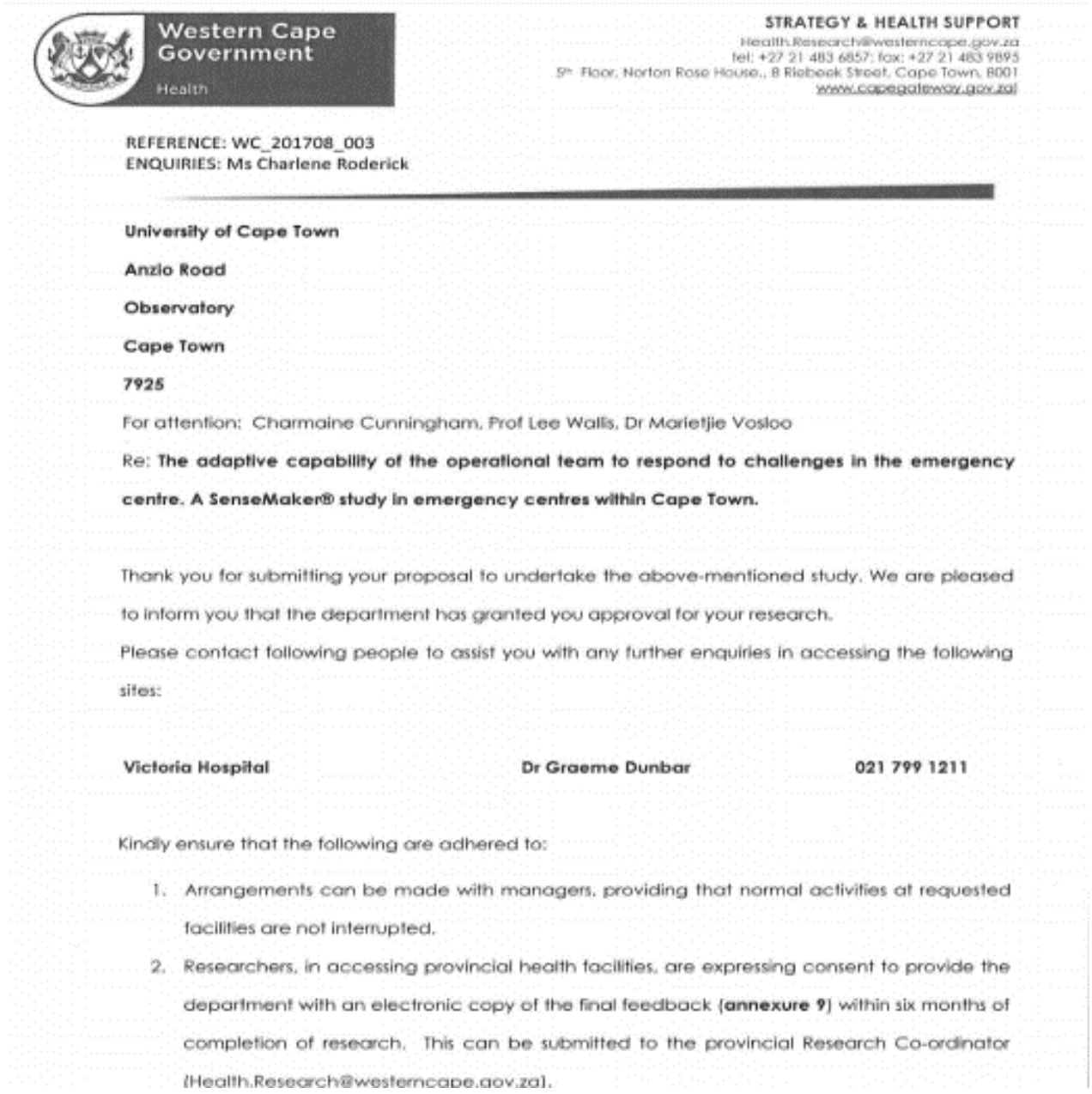
PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

HREC 487/2017

Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI),and Declaration of Helsinki (2013) guidelines.
The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

HREC 487/2017

Appendix 4: Approval to access healthcare facilities



Western Cape Government
Health

STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 6857; fax: +27 21 483 9895
5th Floor, Norton Rose House., 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za

REFERENCE: WC_201708_003
ENQUIRIES: Ms Charlene Roderick

University of Cape Town

Anzio Road

Observatory

Cape Town

7925

For attention: Charmaine Cunningham, Prof Lee Wallis, Dr Marietjie Vosloo

Re: **The adaptive capability of the operational team to respond to challenges in the emergency centre. A SenseMaker® study in emergency centres within Cape Town.**

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.

Please contact following people to assist you with any further enquiries in accessing the following sites:

Victoria Hospital	**Dr Graeme Dunbar**	**021 799 1211**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).

3. In the event where the research project goes beyond the *estimated completion* date which was submitted, researchers are expected to complete and submit a progress report (**Annexure 8**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).

4. The reference number above should be quoted in all future correspondence.

Yours sincerely

Signature Removed

DR A HAWKRIDGE

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 14 | 8 | 2017.

Western Cape Government
Health

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Please contact following people to assist you with any further enquiries in accessing the following sites:

Karl Bremer Hospital	**Leilah Najjaar**	**021 815 8865**

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Please contact following people to assist you with any further enquiries in accessing the following sites:

Mitchells Plain Hospital	**Ms Estelle Petersen**	**021 377 4306**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).

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4. The reference number above should be quoted in all future correspondence.

Yours sincerely

Signature Removed

DR A HAWKRIDGE

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 16/8/2017.

Western Cape Government
Health

STRATEGY & HEALTH SUPPORT
HealthResearch@westerncape.gov.za
tel: +27 21 483 6857; fax: +27 21 483 9895
5th Floor, Norton Rose House, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za

REFERENCE: WC_201708_003
ENQUIRIES: Ms Charlene Roderick

University of Cape Town

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Observatory

Cape Town

7925

For attention: Charmaine Cunningham, Prof Lee Walls, Dr Marietjie Vosloo

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Please contact following people to assist you with any further enquiries in accessing the following sites:

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3. In the event where the research project goes beyond the estimated completion date which was submitted, researchers are expected to complete and submit a progress report (**Annexure 8**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).

4. The reference number above should be quoted in all future correspondence.

Yours sincerely

Signature Removed

DR A HAWKRIDGE

DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 5/10/2017

Western Cape Government
Health

STRATEGY & HEALTH SUPPORT
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tel: +27 21 483 6857; fax: +27 21 483 9995
5th Floor, Norton Rose House, 8 Riebeek Street, Cape Town, 8001
www.capegateway.gov.za

REFERENCE: WC_201708_003
ENQUIRIES: Ms Charlene Roderick

University of Cape Town

Anzio Road

Observatory

Cape Town

7925

For attention: Charmaine Cunningham, Prof Lee Wallis, Dr Marietjie Vosloo

Re: **The adaptive capability of the operational team to respond to challenges in the emergency centre. A SenseMaker® study in emergency centres within Cape Town.**

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.

Please contact following people to assist you with any further enquiries in accessing the following sites:

Khayelitsha Hospital	**Dr Moses Wilbooi**	**021 360 4386**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. By being granted access to provincial health facilities, you are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of your project. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).

3. In the event where the research project goes beyond the estimated completion date which was submitted, researchers are expected to complete and submit a progress report (**Annexure B**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).

4. The reference number above should be quoted in all future correspondence.

Yours sincerely

Signature Removed

DR J EVANS

ACTING DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 24/09/2018

RE: Permission to send research link to EC staff

Donna Stokes <Donna.Stokes@westerncape.gov.za>
Wed 2018/05/23 2:30 PM

To: Charmaine Cunningham <ccharmaine@live.co.za>
Cc: Josh-Lee Kroukamp <Josh-Lee.Kroukamp@westerncape.gov.za>

Dear Charmaine

Permission is granted to conduct your research at NSH.

Ethics-approved
Dr Dickerson- has reviewed the protocol and agreed
Regards
Donna Stokes

Appendix 5: Approval to access students (EM Registrars)

	RESEARCH ACCESS TO STUDENTS	DSA 100

NOTES

1. This form must be **FULLY** completed by all applicants who want to access UCT students for the purpose of research or surveys.
2. Return the fully completed **(a) DSA 100** application form **by email**, in **the same word format**, together with **your: (b) research proposal inclusive of your survey, (c) copy of your ethics approval letter / proof (d) informed consent letter** to: Moonira.Khan@uct.ac.za. You application will be attended to by the Executive Director, Department of Student Affairs (DSA), UCT.
3. The turnaround time for a reply is **approximately 10 working days.**
4. NB: It is the responsibility of the researcher/s to apply for and to obtain **ethics approval and to comply with amendments that may be requested;** as well as **to obtain** approval to access UCT staff and/or UCT students, from the following, at UCT, respectively: (a) **Ethics:** Chairperson, Faculty Research Ethics Committee' (FREC) for ethics approval, (b) **Staff access:** Executive Director: HR for approval to access UCT staff, and (c) **Student access:** Executive Director: Student Affairs for approval to access UCT students.
5. **Note:** UCT Senate Research Protocols requires compliance to the above, **even if prior approval has been obtained from any other institution/agency. UCT's research protocol requirements applies to *all* persons, institutions and agencies from UCT and external to UCT who want to conduct research on human subjects for academic, marketing or service related reasons at UCT.**
6. **Should approval be granted to access UCT students for this research study, such approval is effective for a period of one year from the date of approval (as stated in Section D of this form), and the approval expires automatically on the last day.**
7. **The approving authority reserves the right to revoke an approval based on reasonable grounds and/or new information.**

SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	CNNCH010	Miss Charmaine Cunningham	cchamaine@live.co.za / 082 450 6689
A.2 Academic / PASS Staff No.			
A.3 Visitor/ Researcher ID No.			
A.4 University at which a student or employee	UCT	Address if not UCT:	
A.5 Faculty/ Department/School	Department Surgery, Division Emergency Medicine		
A.6 APPLICANTS DETAILS If different from above	Title and Name	Tel.	Email

SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	Prof Lee A. Wallis	021 650 1829	Lee.wallis@uct.ac.za
B.2 Co-Supervisor/s	Dr. Marietjie Vosloo		Marietjie.vosloo@icloud.com

SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree – if applicable	PhD Emergency Medicine
C.2 Research Project Title	The adaptive capability of the operational team to respond to challenges in the emergency centre. A SenseMaker® study in emergency centres within Cape Town
C.3 Research Proposal	Attached: Yes ■ No ☐
C.4 Target population	Post Graduate Emergency Medical Registrars registered within the Faculty of Health Sciences at UCT.
C.5 Lead Researcher details	If different from applicant: Prof Lee A. Wallis, 01401390, 021 650 1829, Lee.wallis@uct.ac.za
C6. Will use research assistant/s	Yes ☐ No ■ If yes provide a list of names, contact details :
C.7 Research Methodology and Informed consent	Research methodology: Qualitative and quantitative via a Narrative method using a tool called SenseMaker Informed consent: Yes, advised with online survey
C.8 Ethics clearance status from UCT's Faculty Ethics in Research Committee /Chair (EIRC)	Approved by the UCT EIRC: Yes ■ With amendments: Yes ☐ No ■ (a) Attach copy of your UCT ethics approval. Attached: Yes ■ No ☐ (b) State date / Ref. No / Faculty of your UCT ethics approval: 19/07/2018 Ref. /Faculty.: 487/2017

SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE

(To be completed by the UCT - ED, DSA or Nominee)

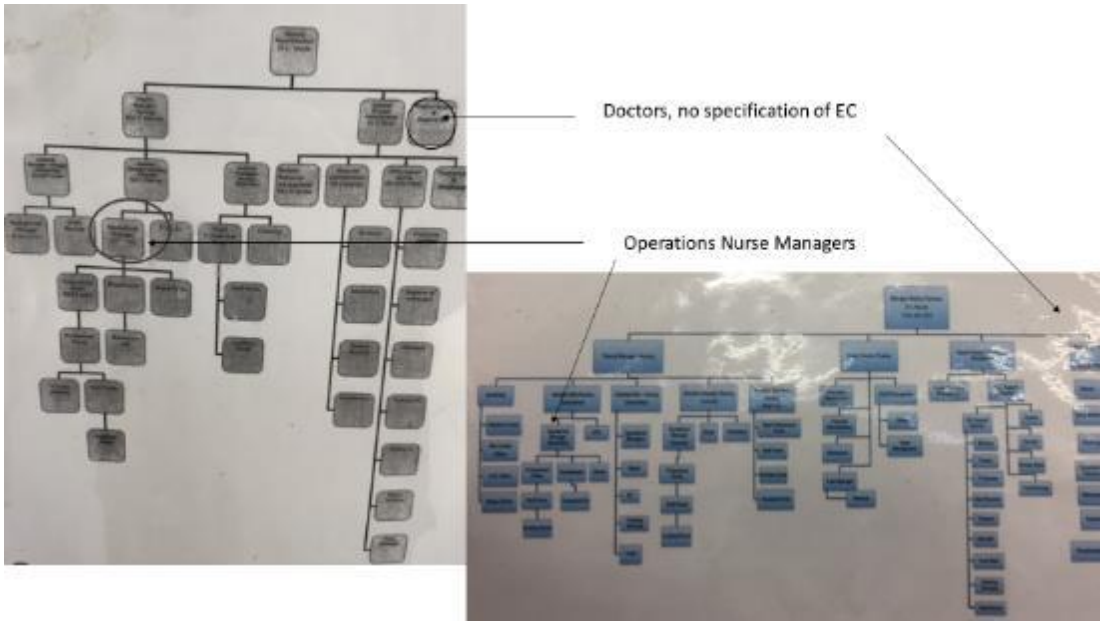
	Approved / With Terms / Not	* Conditional approval with terms	Applicant/s Ref. No.:
D.1 APPROVAL STATUS	(i) Approved ■ ~~(ii) With terms~~ ~~(iii) Not approved~~	a) Access to students for this research study must only be undertaken after written ethics approval has been obtained. b) In event any ethics conditions are attached, these must be complied with before access to students.	CNNCH010 / Miss Charmaine Cunningham

D.2 APPROVED BY:	Designation	Name	Signature	Date of Approval
	Executive Director Department of Student Affairs	Dr Moonira Khan	signature Removed	6 August 2018

Appendix 6: Illustration of EC Organograms

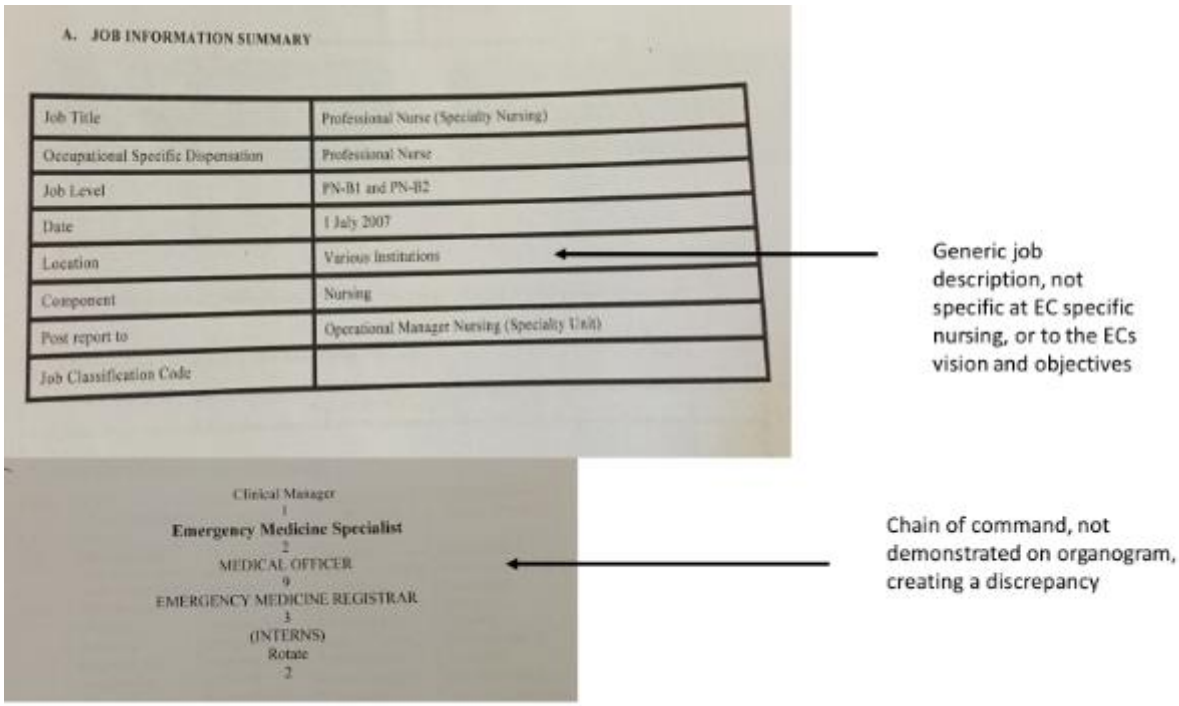
The generic organograms showed on page 94 (Figures 8 and 9) were derived from the EC organograms in all the ECs, below is an illustration used from the facilities.

Communication pathways follows the chain of command to the top of chain, then goes horizontal to the next level, from where it can go down the chain of command.



Appendix 7: Job descriptions

Received from Human Resources. It shows that job descriptions are generic and not aligned with unit-specific strategic goals. Furthermore, the nursing job description is designed for any general unit and not specific to emergency nursing.



A. JOB INFORMATION SUMMARY

Job Title	Professional Nurse (Specialty Nursing)
Occupational Specific Dispensation	Professional Nurse
Job Level	PN-B1 and PN-B2
Date	1 July 2007
Location	Various Institutions
Component	Nursing
Post report to	Operational Manager Nursing (Specialty Unit)
Job Classification Code	

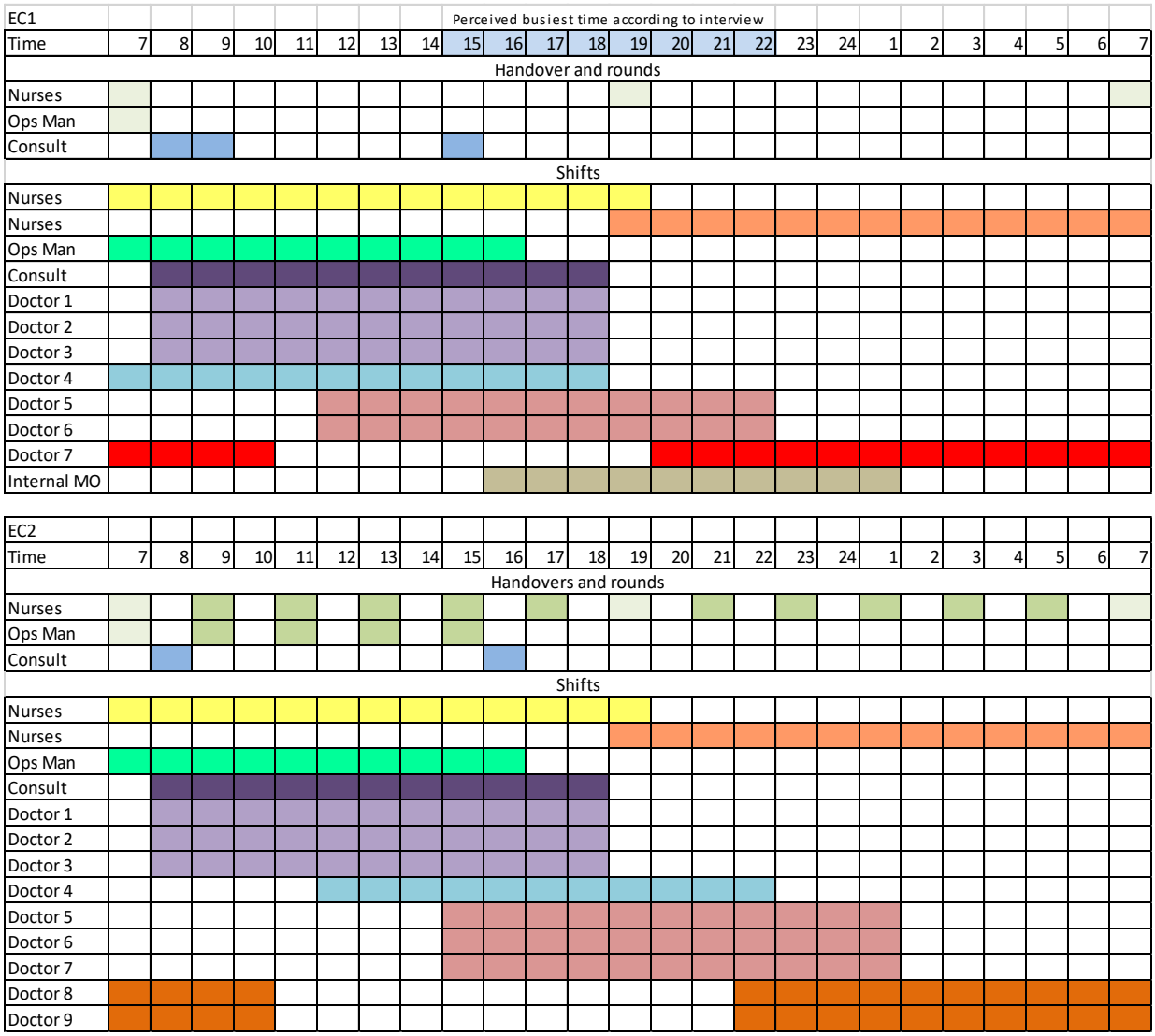
Generic job description, not specific at EC specific nursing, or to the ECs vision and objectives

Clinical Manager
1
Emergency Medicine Specialist
2
MEDICAL OFFICER
9
EMERGENCY MEDICINE REGISTRAR
3
(INTERNS)
Rotate
2

Chain of command, not demonstrated on organogram, creating a discrepancy

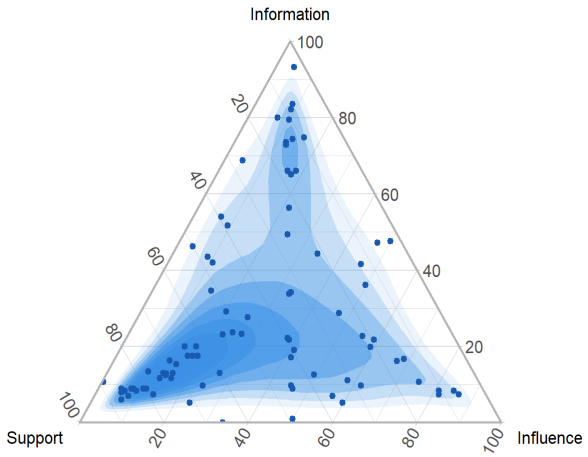
Appendix 8: Example of doctor and nurse duty rosters

As noticed, despite increased demands from the rest of the hospital, and the EC being busier after hours (Section 5.3.7, page 115), there are fewer doctors and nurses on duty in the EC.

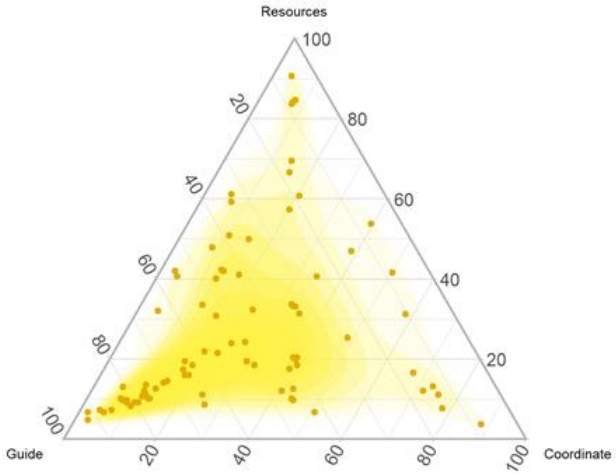


Appendix 9: SenseMaker® single signifier results

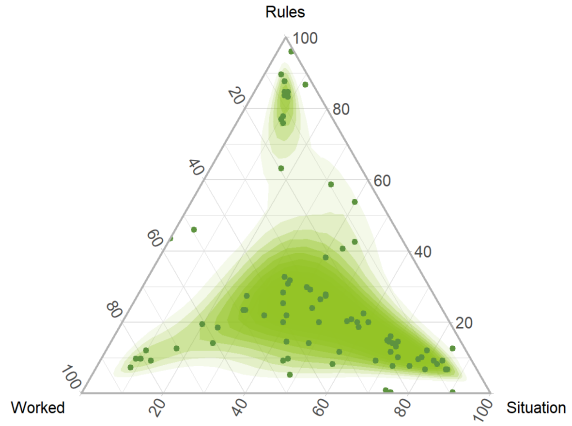
T1:In your story you were most hampered by



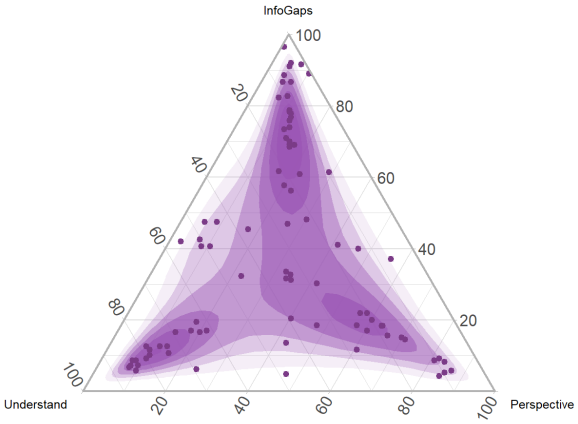
T2: The role of the manager



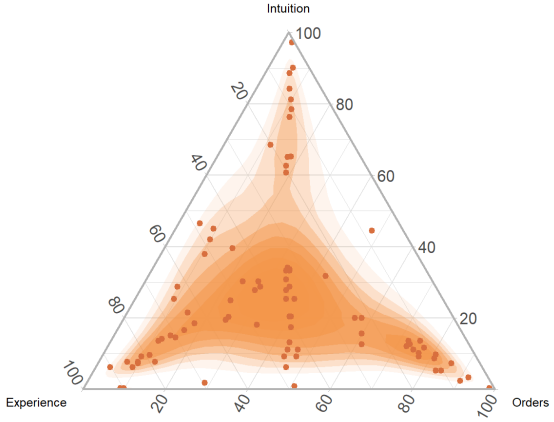
T3: Best to do things based on



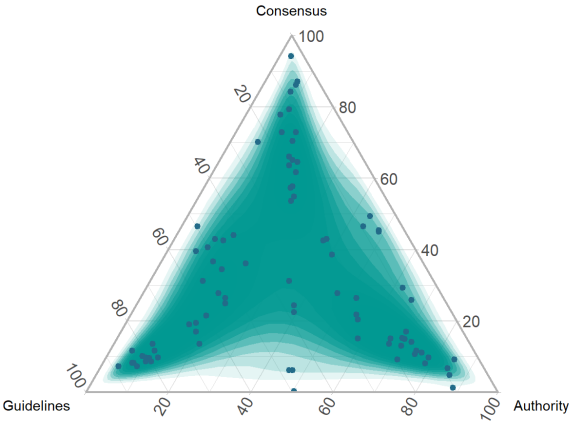
T4: Uncertainty came from



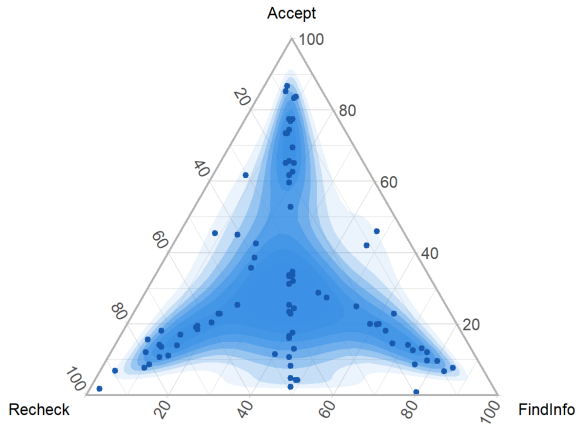
T5: People acted based on



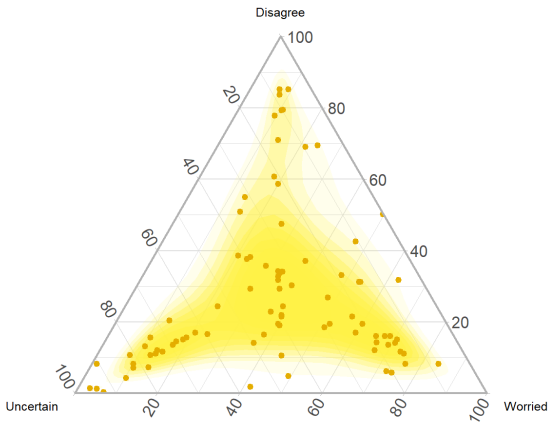
T6: The decision was most influenced by



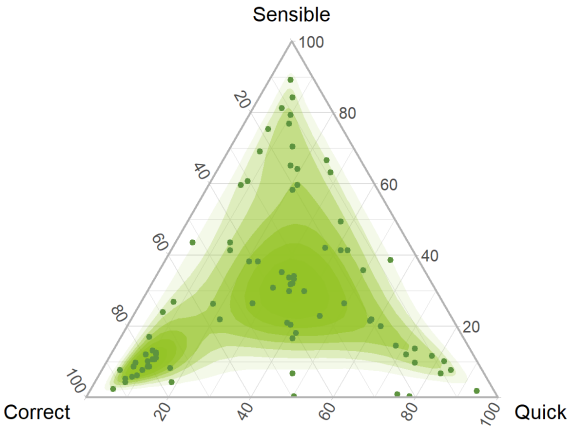
T7: When information and explanation do not match



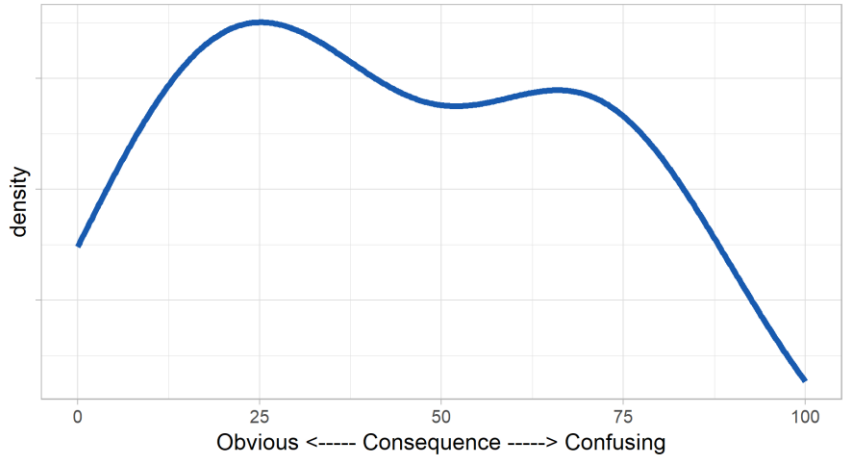
T8: People are more likely to speak up if



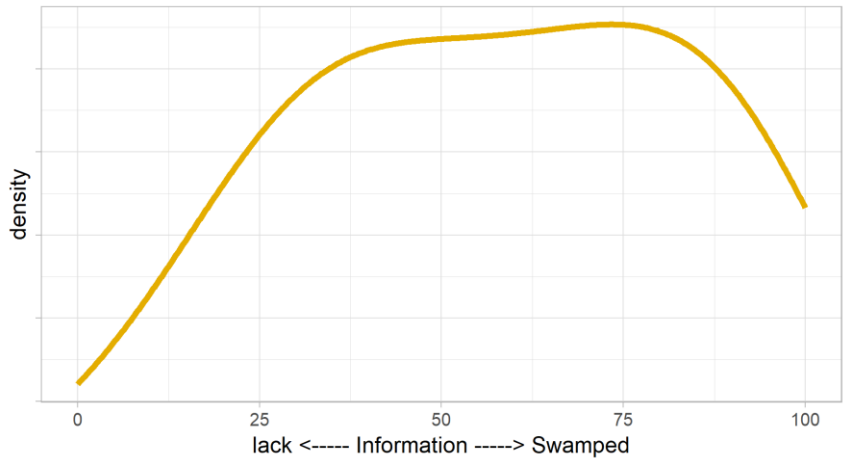
T9: The pressure was on doing something



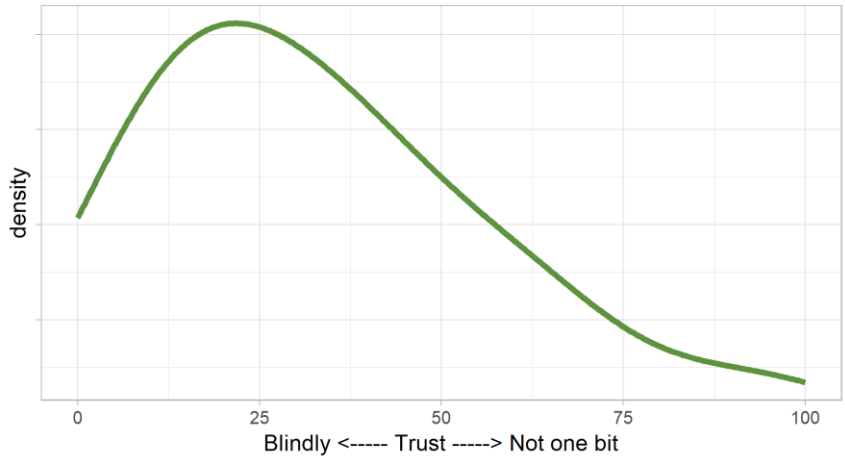
D1: Consequences of decisions were



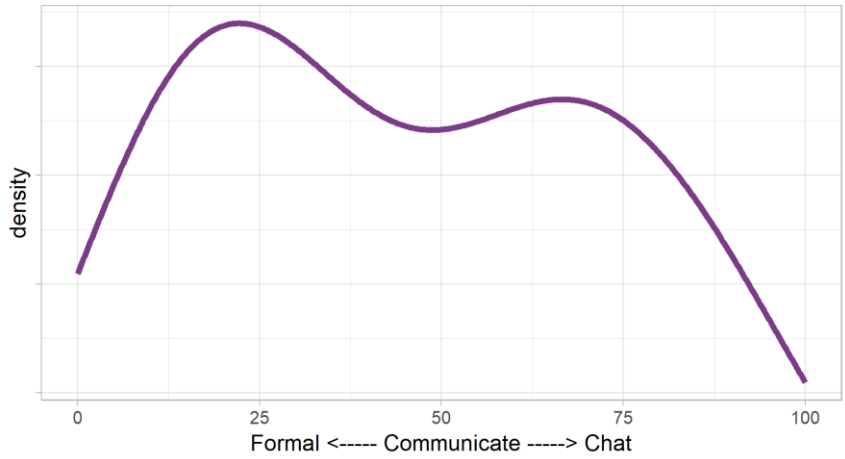
D2: The availability of the required information



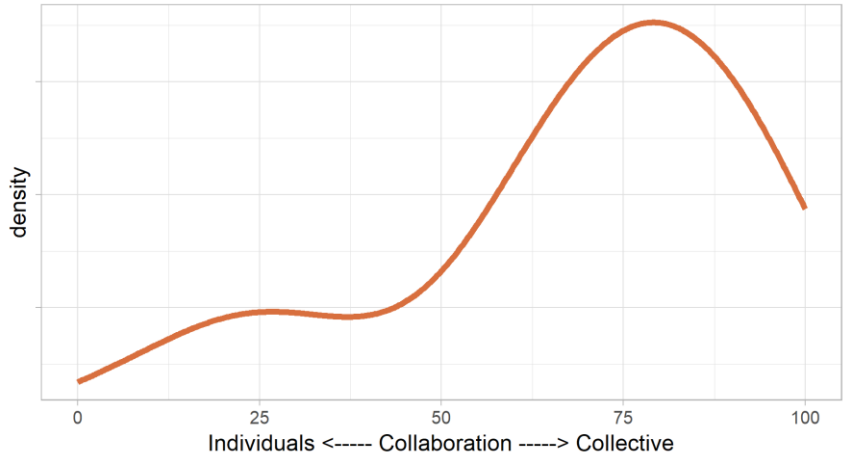
D3: People in the EC trust each other

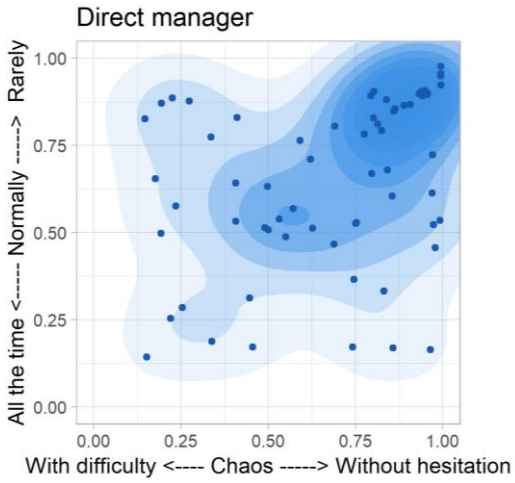


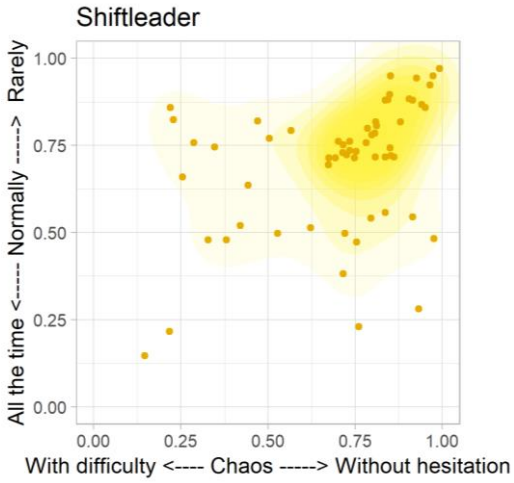
D4: The best way to communicate

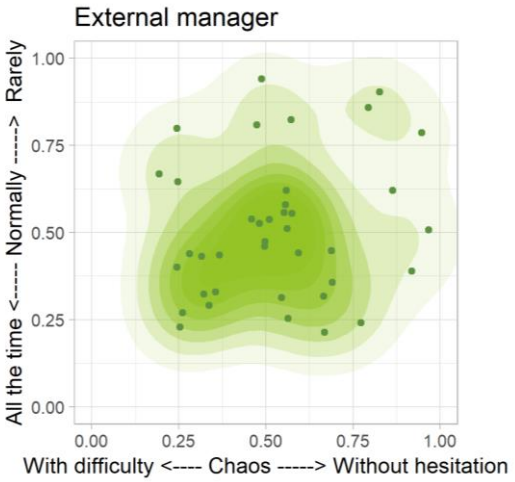


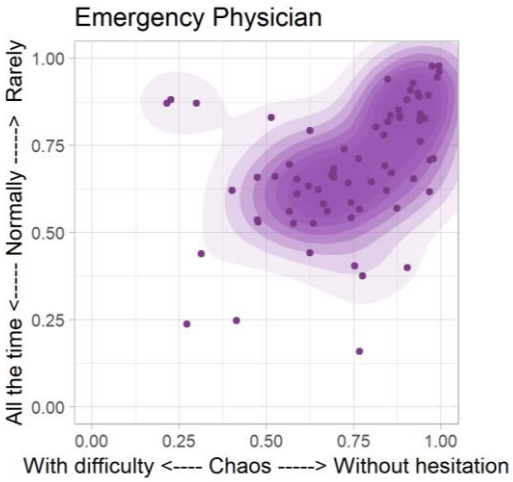
D5: Our EC functions like

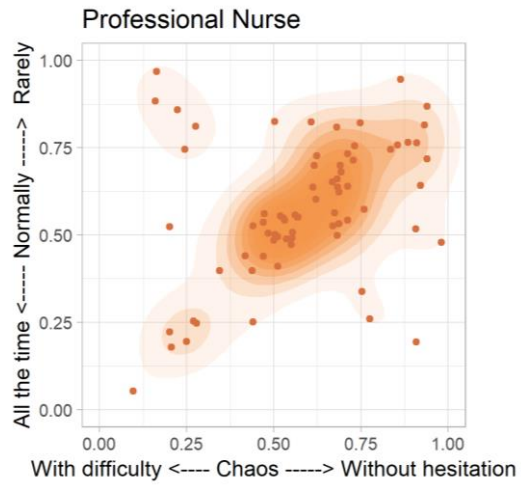


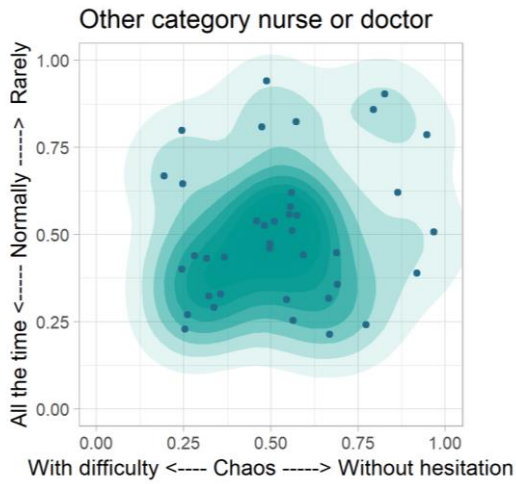

Direct manager
All the time <----- Normally -----> Rarely
With difficulty <---- Chaos -----> Without hesitation
0.00
0.25
0.50
0.75
1.00

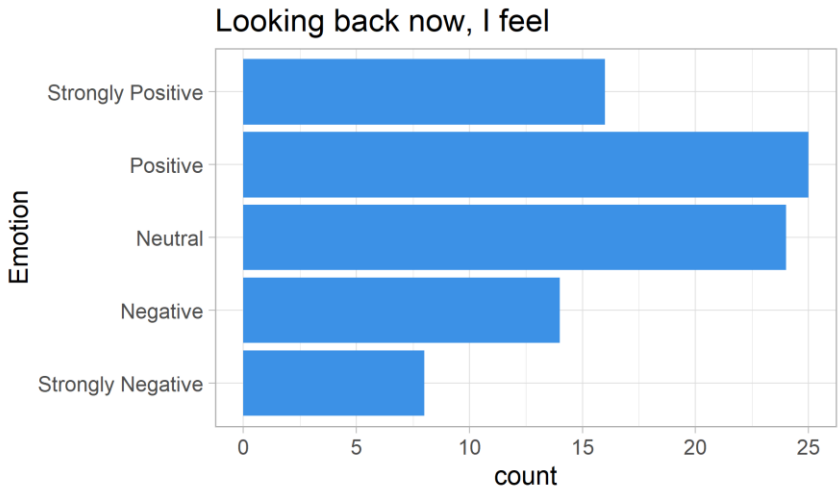

Shiftleader
All the time <----- Normally -----> Rarely
With difficulty <---- Chaos -----> Without hesitation
0.00
0.25
0.50
0.75
1.00

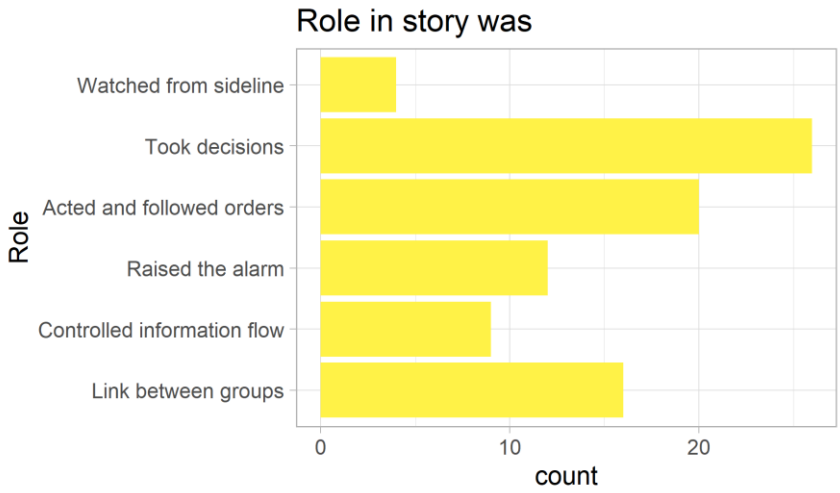

External manager
All the time <----- Normally -----> Rarely
With difficulty <---- Chaos -----> Without hesitation
0.00
0.25
0.50
0.75
1.00

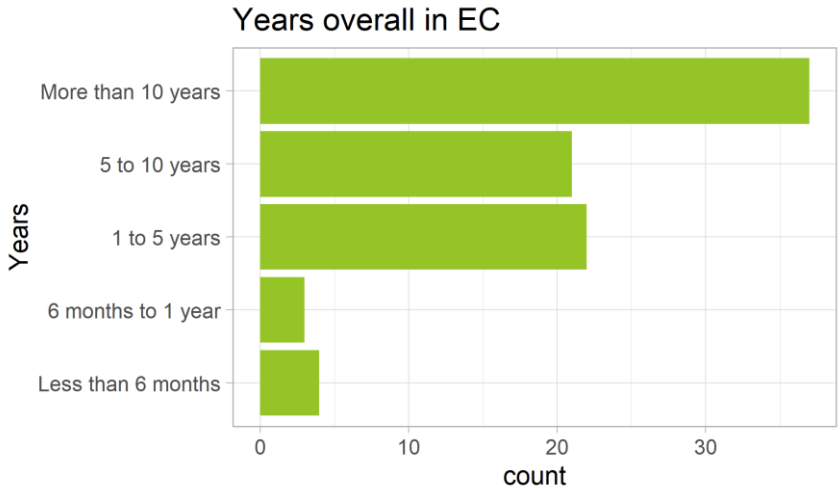

Emergency Physician
All the time <----- Normally -----> Rarely
With difficulty <---- Chaos -----> Without hesitation
0.00
0.25
0.50
0.75
1.00

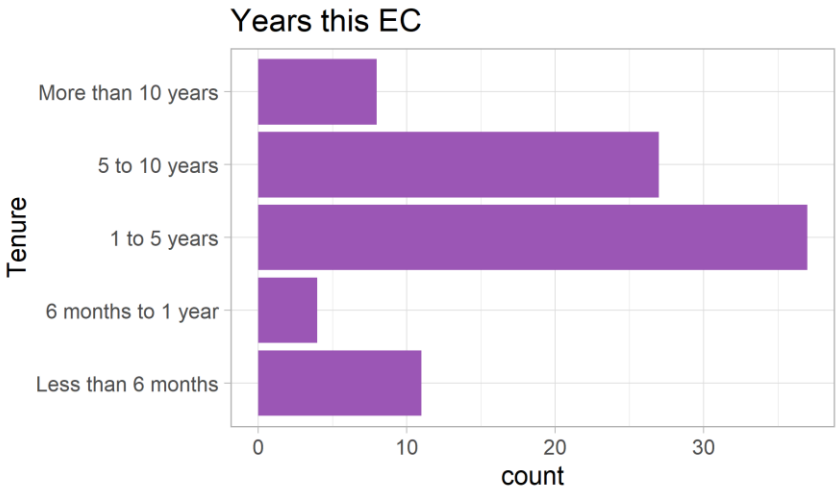

Professional Nurse
All the time <----- Normally -----> Rarely
With difficulty <---- Chaos -----> Without hesitation
0.00
0.25
0.50
0.75
1.00

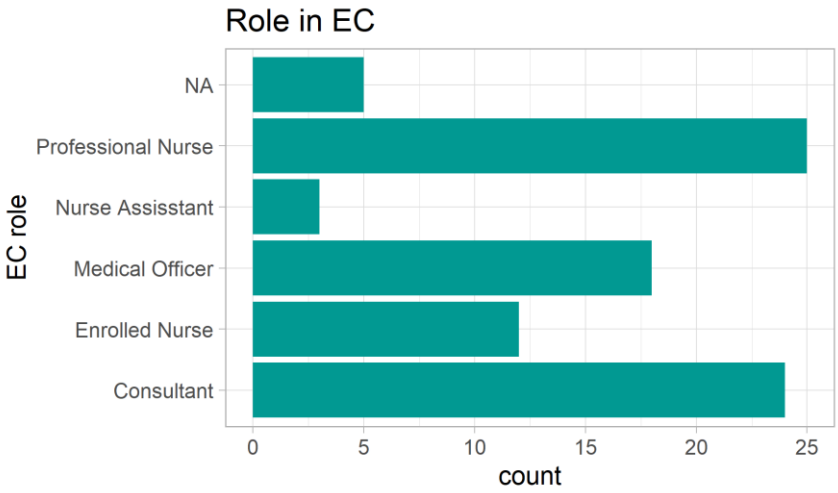

Other category nurse or doctor
All the time <----- Normally -----> Rarely
With difficulty <---- Chaos -----> Without hesitation
0.00
0.25
0.50
0.75
1.00

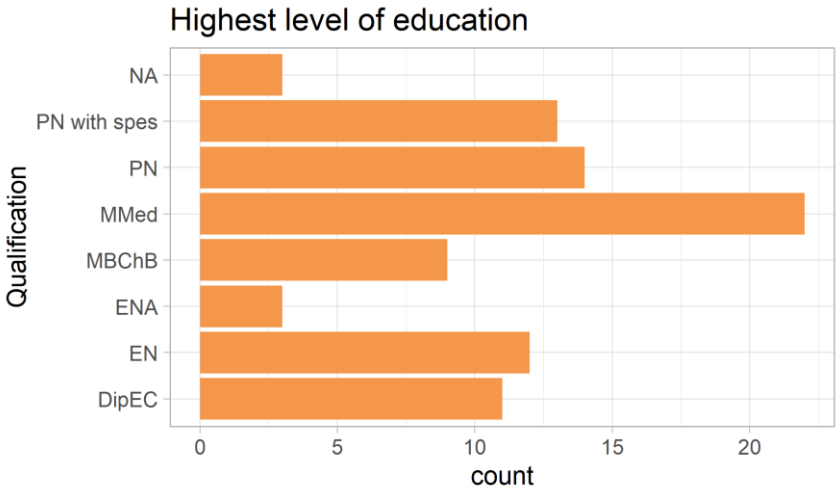

Looking back now, I feel
Strongly Positive
Positive
Neutral
Negative
Strongly Negative
Emotion
0
5
10
15
20
25
count


Role in story was
Watched from sideline
Took decisions
Acted and followed orders
Raised the alarm
Controlled information flow
Link between groups
Role
0
10
20
count


Years overall in EC
More than 10 years
5 to 10 years
1 to 5 years
6 months to 1 year
Less than 6 months
Years
0
10
20
30
count


Years this EC
More than 10 years
5 to 10 years
1 to 5 years
6 months to 1 year
Less than 6 months
Tenure
0
10
20
30
count


Role in EC
NA
Professional Nurse
Nurse Assisstant
Medical Officer
Enrolled Nurse
Consultant
EC role
0
5
10
15
20
25
count


Highest level of education
NA
PN with spes
PN
MMed
MBChB
ENA
EN
DipEC
Qualification
0
5
10
15
20
count